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THE COVER

There is an imperative need for a central food committee in Washington to look after the defense requirements of the food processing industry. It will take such a committee to make available the supplies and equipment necessary to support the slogan "Food Will Win the War and Write the Peace." So the cover of this issue is used to call attention to that need as outlined in the editorial on page 29. On future covers, photographs will be used, as in the past.

FOOD INDUSTRIES

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This Issue

Fighting Food

Custard pies used to be weapons of comedy. But aside from such antics, food men have given little thought to their products as decisive factors in combat.

Now, however, the picture has changed. From Secretary Wickard down, authorities daily impress upon farm interests and food manufacturers the necessity for growing and processing more food. Food must be forthcoming to feed Great Britain, to feed our armed forces and, at the same time, to supply civilian requirements in the United States. And after the war, it is planned to have a great store of food for those European countries that join the United States in assuring a stable peace. It's a large order. But it can be done—IF. For the "if" see page 29.

Save Those B.t.u.'s

It may be necessary for New York's power plants to heat the East River with heat rejected by their condensers, but the average food processing plant can utilize almost all the heat it produces in the form of steam if it keeps track of where the heat goes and installs appropriate equipment. Many alert food processors are doing just this. The savings that one such plant made during the past summer are told on page 43.

No Such Animal?

There is, it seems, a defying difference of opinion as to whether there is or isn't a technical stooge in the food industries. Mr. Alex M. Zenzes wrote of such an invertebrate with the conviction of one who has long studied its habits, expressing his views in the August issue. But an equally convincing authority who has spent many years in the field says on page 34 that there is no such species. You'll enjoy this rebuttal in the chemist-vs.-salesman controversy.

Six Billion Dried Eggs

An explosive expansion of production capacity in the egg-drying industry is under way. In one year that capacity is being skyrocketed from 9,000,000 to more than 150,000,000 lb. And in 1942, 500,000,000 doz. eggs will be needed for dried-egg production. To lay the groundwork for this tremendous program, an egg-drying school was held at Kansas City, Mo. At that school authorities from industry, government and universities put out a wealth of facts and figures on the technology and economics of the industry. This information was taken down by a Food Industries editor and is published in this issue. Page 40.

Coming

So You Can't Attend the Show?

Of course, if you are one of the fortunate food processors who will attend the 18th Exposition of Chemical Industries, you will have an opportunity to see for yourself the wealth of new equipment for food industry plants that will be shown there.

Many, unfortunately, can't take the time to come to New York for this exhibit. For them, the next best thing will be to read Food Industries' "Preview of the Show" in the December number. This will cover briefly the equipment and materials useful to the food manufacturer.

My Business Is Different

How often you hear someone say "My business is different." Maybe it is, but more often the difference is superficial; the underlying factors are similar. If you don't believe that, visit a number of food plants making a diversity of products.

But perhaps you haven't time to make such visits just now. So, to save your time, we have gathered a group of pictures for our December number that show, step by step, the operations carried out in processing a number of food products. Look them over, and you will agree that the operations used in common are at least as numerous as are those peculiar to a single industry.

Machine Has Man Trouble

Continuous processes are a coming thing in the food industries, but apparently it will take more than technical ingenuity to make them successful. Take the case of the continuous cranberry jelly unit described in the April, 1939, issue of Food Industries. The company had a dickens of a time getting this machine operating satisfactorily, because the workers who fed and operated it feared that it was a technological Frankenstein which would do them out of their jobs. And did they throw monkey wrenches into the works! But G. T. Reich, technical director of Pennsylvania Sugar Co., will enlighten and amuse you with the story in the next issue.

More Than a One-Time Shot

Obviously, the problems involved in the tremendous expansion of the egg-drying industry cannot all be covered in one article. So another will be published next month. H. A. Mulvaney, San Francisco engineer who perhaps knows more about egg-drying methods than anyone else, will tell about the three methods of drying—pan, belt and spray—giving technics, times and temperatures. And he will discuss breaking-room practice.

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FOOD INDUSTRIES
FOR THOSE WHO CONTROL QUALITY
THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor NOVEMBER, 1941

Central Food Committee Imperative

FOOD will win the war and write the peace," said Secretary of Agriculture Wickard recently. Nice slogan.

But what is meant by food? Is it fresh milk on the farm, milk in bottles, or does it mean evaporated milk, cheese, butter or dried milk—all processed and packaged, ready for export?

Does food mean livestock on the hoof, or dressed carcasses in the cooler? Or does it mean frozen quarters, or canned and cured meat, all smoked and packaged, ready for shipment abroad?

Does food mean eggs in the hen house, or does it mean cased shell eggs, or frozen eggs, or dried eggs in containers for overseas shipment?

Are fish in the sea the sort of food the Secretary has in mind, or fish in trawlers; or does he think of canned, frozen, dried or salted fish in packages ready to ship to Britain and her allies?

To any informed person it is obvious that the foregoing list could be extended, also that the chief demand is for protein foods. And, furthermore, that all protein foods are highly perishable in the raw state. Also, much needed are the "protective foods," those naturally rich in vitamins—particularly vitamin C. To a considerable extent, these are made up of fruits and vegetables, also highly perishable.

Plainly, every food except dry grains and seeds must be processed in order to preserve it. Hence, processing and preservation of foods are indispensable to aid to Britain and to defense of the United States.

Foods Are Munitions

Because processed and preserved foods are indispensable in the present emergency, they have become strategic materials of war. That this is broadly recognized in Washington is evident from recent public statements of many government officials.

Unfortunately, however, a No-Man's-Land, a blind spot, has existed up to date in official Washington, and it has caused no end of trouble for food manufacturers. This blind spot is failure to recognize that the vital functions of food processing and preservation must be carried out before foods can serve their purpose in war.

On one hand we see the Department of Agriculture campaigning to increase production of food raw materials. On the other hand are the efforts of the Administration to get the finished processed foods for shipment abroad. But in between there is a gap in the chain of events—a gap that can only be closed by the function of the food processor. Unless his work is carried out successfully, the raw materials are of little help to nations overseas who are fighting for their very existence.

Size of the Task

In other words, processed foods are products just as indispensable to the successful conclusion of this war as guns, tanks, airplanes, ships and ammunition. And production and processing of these foods demand as long-range planning as any other material of war. Also, these foods have another function. Just as Britain and her Allies cannot fight without food, so also must their civilian populations have proper food if munitions for their fighters are to be manufactured. This, of course, applies as well to the population of the United States, who must also produce munitions for the fighters.

Thus the problem of food processing facing the Administration and the food manufacturers of the United States involves not only the feeding of

130,000,000 Americans, but an additional feeding load of 20,000,000 or more in Great Britain and, eventually, many millions more in other countries. And keep in mind, this additional feeding load will be practically all made up of processed and preserved foods, in contrast to peace-time food needs that are in part met by unprocessed foods.

Food Committee Must Be Formed

Washington is just beginning to discern this food processing problem—just awakening to the existence of this No-Man's-Land. As the Supply Priorities and Allocations Board develops the master plan, it is becoming aware of the need for comprehensive treatment of food processing, just as it is handling the building of guns, tanks, airplanes and ships.

Unfortunately, its attack so far has been piecemeal. It has moved, for instance, to set up a single industry committee on equipment used in the canning field. But it has not acted to enlist the whole broad range of food processing industries for this emergency.

What is needed is a strong central committee for the food processing industries as a whole—comparable to the Pulp and Paper Division of OPM, which is already functioning.

Such a general food processing committee to advise with SPAB and work under OPM on the combined needs of the various branches of food processing is a vital necessity. It will prevent piecemeal and chaotic treatment of the strategic problems of food processing and supply, and insure that all aspects of the whole broad problem are considered. It should be headed by a broad-gage man of technical training and wide experience in food processing and preserving. And it should be staffed by men thoroughly familiar with the processing problems and industry needs of the important groups of foods concerned—milk, meat, eggs, fruit, vegetables, fats and vitamins.

It's Your Job

Vital as the need is for this committee, they alone cannot do the job in Washington. They must be backed up 100 percent by the food processing and food equipment industries.

It is you, food manufacturers and equipment makers, whose job it is not only to provide such an advisory committee, but also to take the necessary steps as individuals to cooperate in providing the required quantities of processed foods. You have a terrific job ahead of you, whether or not you now produce defense foods.

If, when and as SPAB gets its master plan for foods formulated, you will get allocations or priority numbers from OPM that will let you get what you will need. Washington opinion has it that the priority numbers will begin with A, which is assigned only to defense matters. But you must have sound plans ready for an enlarged program of production of foods actually needed for defense, or you will be unlikely to receive relief from the current scarcities.

Just what foods are needed for defense must await official definition before it is possible to say which branches of the food industries will receive government aid to expanded production. Already, dried eggs, dried milk and some canned foods have had official boosts. In between these common defense food staples and those exotics that are definitely out, there lies a broad range of common processed foods, many of which will also receive aid.

This Must Be Done

But, in any case, it is imperative that all food manufacturers examine their own affairs earnestly and honestly. If there is any doubt at all as to whether one's products will be considered essential for civilians or armed forces, then one should begin to plan for conversion of one's plant to a defense food enterprise. As stated, there are terrific problems ahead—problems of expansion of production and procurement of raw materials; as well as problems of conversion of nondefense food plants to defense food manufacture, or else possibly limping along without any aid, or perhaps both.

Not only are there problems of the foregoing character; there are also problems of finding satisfactory substitutes for food ingredients and packaging materials that are no longer obtainable.

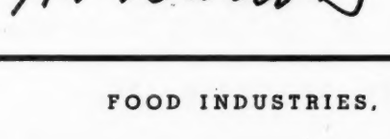
Feeding the civilians and armed forces of the United States and Britain, and preserving available supplies of perishable and protective foods, is the big job ahead. It may grow bigger in the future. It may become a demand for food for 200,000,000 persons. And it will not diminish much in size until long after the war is over.

Food Men Must Awake

The times call for active and prompt cooperation among food manufacturers, equipment makers and OPM to do a job that will be far beyond anything most of us visualize.

This job calls for far more vision than evidenced by many food manufacturers with whom I have lately talked. In a recent trip of 4,300 miles, I talked with 126 firms about their plans, with specific reference to one possible shortage. Only one man had foreseen the problem and had prepared a solution! The others guessed "that couldn't happen here"!

The job ahead of the food industries is tremendous. We can and must do it, or food cannot possibly win the war or write the peace.



EDITOR

The Talk of the Industry

● No greater problem faces the nation and its defense program with respect to the food industry than that of convincing industry and the government of the need for long-range planning on food preservation. For that reason, all other editorial comment has been subordinated for the time being. After this urgent need is satisfied you will see *Food Industries* in its customary form.

● From the investment viewpoint the new tax law should not make so great a difference in returns on common shares as many have anticipated. Competent business economists have calculated that for a decline of $1.00 in net before taxes, there will be a decline in net after taxes of only about $0.25 per share.

● New-food note: Skunk cabbage. A friend writes, "Cook like any green, until tender, then serve with butter, salt and pepper. We tried it. The result was fine—in fact, I liked the flavor a lot better than some spinach I have bought from first-rate stores."

● What to do with salesmen when your production has been sold out has been solved by one medium-sized concern. They have taken all salesmen off the road and put them to work in the plant. Several of them are learning for the first time of the real effort and skill used in the production of the wares they have been

selling. Incidentally, one of them has developed into the best night foremen the company ever had.

● Judging by the large number of inquiries that have come to our ears for men who are technical packaging specialists, many of the food manufacturers are at last aware of the multitude of problems ahead in the field of proper food packaging. In some cases the effort to find experienced packaging men resembles an attempt to get fire insurance after a fire has started.

There is no simple route to a sound and complete knowledge of packaging. No field of human activity is more fluid, or more rapidly changing, than is packaging today. What one may learn about it today is often valueless tomorrow because of changes or shortages in this or that material, which in turn, usually stems from chemical shortages.

To learn packaging one must do packaging work in both plant and laboratory. What knowledge exists is not systematized, not organized, and there are no books on the technical aspects of packaging. Heretofore, most of the material in book form on packaging is devoted only to decorative, impulse-sale-creating and merchandising aspects of packaging. These aspects are important to be sure, but are of small utility today in a seller's market, and under conditions where the problems of protective packaging are increasing daily.

It is never too late to begin, however. But, we would counsel that little time be wasted in combing the country for footloose specialists. They are not footloose today, and it is going to take an awful lot of money to attract them away from firms that have been farsighted enough to have had them in their employ for several years.

● Post-war economic planning is a subject that recurs frequently wherever industrialists get together. Everybody agrees that we must plan now for a period when the government will cease to be industry's biggest customer. To that extent business has a much more mature viewpoint than existed 24 years ago.

Unhappily, there is always a time element whenever a plan is prepared, and in the current emergency the time element is receiving very little serious thought. Some calculations are based on a completion of the U.S. armament program by 1944 (apparently assuming that the U.S. is not involved in war). More of the calculations are based on an emergency of 8 to 10 years duration, without reference to our participation.

One thing is evident, however: Top men in American industry are already preparing for a period when a lowered standard of living will be forced on us. Regardless of the duration of the war effort, it is a hopeful sign that the impending problem is recognized.

● *Pacific Rural Press*, a West Coast farm publication, is raising editorial hell because margarine can now be

legally enriched with vitamin A and because the Department of Agriculture is telling the public about it in *Consumers Guide*. The instigation for the outburst comes, as usual, from cattle breeders, this time from the Holstein-Friesian Association. It's always the pure bred livestock registry association that protests longest and loudest against reasonably fair treatment for margarine. The biggest per capita margarine consumption is in Minnesota and Wisconsin, both leaders in milk production. One wonders if the Holstein-Friesian Association knows that enormous quantities of skim milk are indispensable for margarine production?

Sweetened Condensed Whey

How to make canned whey pudding described elsewhere in this issue is, we hope, likely to raise a number of queries as to where to get sweetened condensed whey. As far as we know this material is not yet an article of commerce. You will have to get it made to order from some of the larger dairy companies who make cheese and also have available the necessary condensing equipment. Or possibly the authors might be able to supply small amounts for experimental purposes.

Whey is a byproduct of cheese manufacture that has had very little

use despite the fact that it contains valuable food elements and is available in huge quantities. Hence we are encouraging the development of ways to utilize it commercially, for as soon as the market is created, those who produce this little utilized by-product will be quick to supply it in commercial form such as sweetened condensed whey. The times call for utilization of every bit of our national resources.

Tea-seed Oil—Again

Two interesting trials under the old Food and Drug Law have been recently reported, No. 31076 and No. 31077, *Notices of Judgment*, F&DA. Why one of these cases that was adjudicated in 1937 should not have been reported to 1941 is not explained. That, however, is of minor interest compared to the fact that alleged adulteration of olive oil with tea-seed oil was litigated in two courts with results that were diametrically opposite.

The oil came from the same company, and in one trial it was brought out that this company had been manufacturing a second line of oils that was labeled to show it was an admixture of olive oil and 15 percent of tea-seed oil. The Fitelson test for tea-seed oil was the principal basis of the government's case.

One case tried by a court with no jury resulted in a verdict for the claimant and the oil was released. The other case tried before a jury resulted in a verdict for the government.

One wonders where these conflicting judgments leaves the Fitelson test.

To Blanch, Or Take a Chance

To blanch or not to blanch is the question that frequently is being debated where the dehydration of vegetables is under discussion. Trained food technologists usually are in favor of the heat treatment of raw vegetables for the purpose of inactivating enzymes that later may cause deterioration. On the other hand, many who have had industrial experience in this field believe that it is a needless procedure and an unnecessary expense both for equipment and its operation.

To settle the matter, it would appear that scientific evidence can be collected and should prove ample if tests are properly planned. One point that should be emphasized, however, is that each and every type of vegetable must be tested not only by species but also by variety. On matters of this character it is unwise to attempt to reason by analogy when actual experiments can produce definite evidence.

Complacency May Be Dangerous

Food manufacturers who cater to the distributor-label trade haven't, up to now, had any troubles about container or carton supplies when the distributor procures these needed supplies for his producers. In fact, many producers feel very comfortable about their present freedom from responsibility.

But, one wonders, what would happen if some half-baked order would come out of Washington that would allow to any food manufacturer no more shipping containers than he himself had purchased in the preceding year? In such case would not the producer be forced to continue a business relationship, possibly on buyer's terms, or get none at all until the situation were rectified? It appears to us that complacency may be a very dangerous policy here.

Hors d'Oeuvres

• October 18 was "Sweetest Day," when you were supposed to promote sweets. How'd you make out?

• *Italians, according to Popoli di Roma, are withholding chestnuts from the market. And who could blame them, seeing as how Old Muss can't pull their chestnuts out of the fire.*

• Everyone goes nuts at Halloween time, but the boys who promote doughnuts go the farthest. Here are some of their October inspirations: "Doughboy Donuts, Vitaminized for Health Defense"; a donut diet; a world's championship dunking contest. Why not a slogan: "Donuts are Da Nuts"?

• *That doughnut reducing diet is really something. You eat two doughnuts four times a day (not the same two, silly) and wash them down with coffee, milk or fruit juice. It's guaranteed to remove the doughnut from around your waist.*

• British children are being induced to buy carrot lollypops to give them vitamin A. They're carrots on sticks, with sugar sirup coatings. And there you have a new idea, free, gratis, for nothing.

• *A patent for woven steaks has been granted. Thin slices of meat are spun through rotating dies and woven under pressure to form a compact, tender piece of meat of uniform thickness. We can't decide whether the inventor had a bully idea or was given a bum steer.*

• Talleyrand died in 1838, but he left the world an enlightened conception of coffee: "Coffee should be black as the devil, hot as hell, pure as an angel, sweet as love."

• *Bocage, a Portugese poet who died in 1805, had a more refined definition for coffee: Odorous nectar of soft warmness, which kindles the fire of genius and revives the heart."—All for a nickel, with one cream.*

• Prune Institute of America has devoted itself to improvement of the prune. So one of the world's problems is about to be solved.

• *With the aid of colchicine, x-rays, indoleacetic acid and other botanical stimulants, any old weed, scientists say, might become a source of wealth. Who knows, some day you may go from ragweeds to riches.*

• The Romans had a pure food law prohibiting the sale of any fish that had lost its glisten. All was sold that glittered.

• *Ice cream is now being flavored with spinach, carrots, peas and asparagus. Sounds like an Eskimo vegetable dinner.*

• At Cornell, specially prepared butter was kept in sub-zero storage for six years and tasted almost as good as the fresh product. This would enable a war battered nation to be well buttered.

• *Battle Creek, Mich., is forcing restaurant owners to attend a school for food handlers. Imagine, making a man learn something about his business!*

• Pan-American Coffee Bureau has a new slogan: "Get More Out of Life with Coffee." Or, you might say: "Jump and Jive with Java." But sometimes I Sanka I rather sleep.

• *Chester County, Pennsylvania, produces 25,000,000 lb. of mushrooms a year, more than half the country's supply. And any time you happen to have an abandoned coal mine on your hands you can go into the business too.*

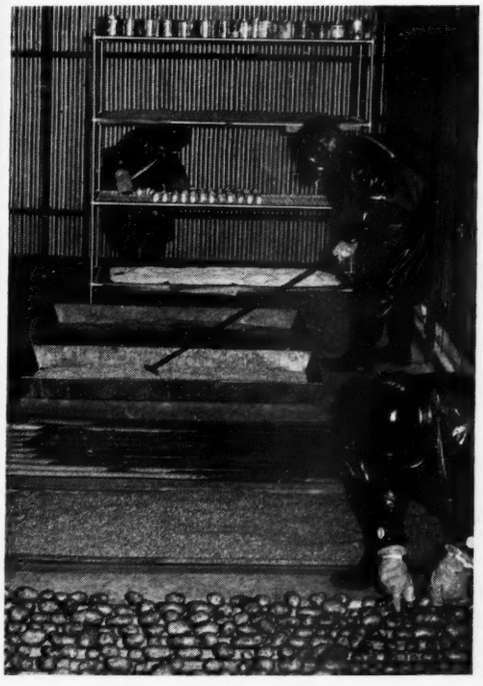
• There has long been an argument as to which state grows the most grapefruit. Now comes a Department of Commerce report on the production of the juicy squirter: Florida, 592,685 tons; Texas, 501,270; California, 81,899. Which data dust another dither.

F. K. L.

"GASSED" FOOD RECLAIMED BY BRITISH

Gas has not been used against the British, but they have established a food decontamination training center just in case. Pictures show decontamination corps practicing its technics after exposing food to gas.

Equipped with gas masks and completely protected by special gloves and uniforms, two members of the British decontamination corps cut away affected parts of a large piece of beef. This meat supposedly was splashed with liquified war gas. The British do not intend to be starved out by a gas attack should Germany resort to that type of warfare.



Food being aerated in a special building to remove gas and make the products fit for human consumption. The foods are spread out on metal trays and stirred to admit air. In the background are eggs, tins and other foods on wire-screen shelves.

One of the members of the decontamination corps swabs a tin of gassed food with bleach cream. This treatment is administered to cans that have been splashed with liquified mustard gas.

Photos from British-Combine

Two of the D.C.'s reclaiming the unspoiled part of a piece of cheese by cutting away the portion affected by gas. This cheese supposedly was splashed with liquified war gas.

TECHNICAL STOOGE? —PHOOEY!

By a FOOD TECHNOLOGIST

Grab your hat. Here's a whirlwind reply to "The Technical Stooge" article in the August issue. The author methodically and logically takes the "stooge" idea apart, and in the process offers some constructive answers to the chemist-vs.-salesman argument.

WHEN the August issue of the new and greatly improved FOOD INDUSTRIES arrived at this writer's desk my attention was attracted immediately by two cartoons which seemed rather unusual in character as illustrations of technical reading matter.

Upon closer investigation, they turned out to reproduce most effectively the impression conveyed to the reader by the article entitled "The Technical Stooge," written by one A. M. Zenzes of Mexico City.

It is difficult to believe that anyone connected or familiar with the food industries in the United States—and I understand that Mr. Zenzes claims to be—can have had all the sad experiences which undoubtedly precipitated his tirade against the unfortunate and deplorable "situation" that exists probably in a few companies but certainly is not representative of the entire food industry. Obviously, Mr. Z. has traveled in bad—in fact, it must have been very bad—company. Indeed, he deserves our sympathy, and even pity, for having missed the opportunity of meeting the type of representative predominant in the sales and promotion departments of our leading food concerns.

In order to disperse every possible suspicion that the author of the "Technical Stooge" has stepped on a toe where the shoe pinches, I wish to state emphatically that I am neither connected with sales nor purchasing. I am merely a chemist who, engaged partly in consulting and research and partly in editorial work for the past 12 years, has had many opportunities of observing both the technical and the sales and promotion ends of different branches of the food industries.

Unfair Picture

In my opinion, the picture of sales practices painted so dark by Mr. Z. is not only unfair to the majority of sales representatives and their employers, but it is also inaccurate and incomplete. Everybody knows one, or even a few, "personality salesmen" of the type so admirably depicted in the cartoons. But certainly they are the exception and not the rule—and that for two good reasons: (1) No reputable firm would chance its reputation by such representation; and (2) even if employed, this type of salesman would fail to hold his customers for any length of time in the keen competition that marks the food business today.

If Mr. Z. were better acquainted, he would know that most successful sales representatives of our leading food companies are either chemists or engineers, well versed in the manufacture and application of the product or equipment they sell and fully cognizant of the importance of the technical staff in the research and sales service departments of their firms. It would be very profitable for him to study—without prejudice—the contributions made by these men to food research, improved plant operation and product development by reviewing and attending the programs of technical societies and associations in the food field.

The often debated supremacy and advantages of the sales personnel are frequently a myth, and where they do exist, they are usually well deserved by initiative, perseverance and personal sacrifices of time and normal family life.

I cannot but feel that some of Mr. Z.'s grievances sound like sour grapes. If the "technical man" resembles only slightly the miserable creature in the cartoon with an inferiority complex and the docile nature of "Jeeves, the Stooge," he deserves no better treatment. Today, every food technologist who possesses a fundamental knowledge of food production and a progressive mind—as well as the necessary guts—can go out and take advantage of the potentialities offered in sales promotion work. The choice between "Technical Stooge" and "Super-Salesman," in the best sense of the word, is his. So much for the article itself.

With few exceptions, the sales personnel engaged in the food industries needs no defense, nor is it necessary in most instances to stress the importance of mutual cooperation and respect between the technical staff and the sales force in the development of new products and their promotion. There are, always have been, and always will be, some firms and representatives, as well as some "technical men," who do not live up to the comparatively high standard set by the food industries as a whole.

Room for Improvement

This, however, does not mean that there is no room for improvement in the relationship between seller and buyer, and especially between competitors. Far from it. There would be no point in challenging Mr. Zenzes, for he undoubtedly has good reasons for his opinion and statements, unless this criticism of his generalization is accompanied by constructive suggestions. There is one point in particular in which one can heartily agree with Mr. Z. As a technical editor I can attest to the almost unlimited expectations of food manufacturers with regard to free technical consultation. This is true particularly for the producer of consumer goods.

It is this category of food manufacturer who most often fails to recognize the value that can be derived from the employment in his own plant of a food technologist whose duties combine product control with research or the services of a consulting laboratory. Generally, it is he who depends upon the sales personnel and research departments of what is known as "allied industries" to keep him informed of the technical developments in his own field. And it is usually he who depends upon the "service man" or "trouble-shooter" to straighten out his production problems. True, this situation—and it is a serious one, both for the manufacturer and his supplier—has been brought about to a large degree by these same "allied industries" which have striven to outdo each other until, in many instances, the costs for their "free technical service" by far exceed reasonable limits.

However, it cannot be denied that much of this work has been chiefly responsible for the progress in specific branches of the food industry which do

nothing to further their interests by institutional or otherwise cooperative research. In many instances it has paid large dividends to the manufacturers for whom it was intended, as well as to the company rendering the service. In some cases it has developed entirely new uses for the products in question and has opened new markets.

More Research Needed

Nevertheless, more organized fundamental research is necessary both in individual plants and by and for the benefit of industrial groups manufacturing the same or similar products. Under the present system of general acceptance of the results, formulas and methods provided by the promotion departments of big companies or by association-supported research organizations, there is becoming evident a tendency toward standardization that affects processing methods as well as the flavor and character of food products. The best examples of this trend are the typical loaf of American white bread and the typical dish of American ice cream. Admittedly, there is less poor bread and ice cream than in earlier times, but both these food items taste practically the same from coast to coast. If the declining bread-consumption curve is any indication of what might happen to other foods, it is high time to stop and give some thought to the flavor problem.

Speaking as a consumer—and we all are consumers—I have often wondered whether the gradual industrialization of food production does not deprive us of many culinary adventures formerly provided for in American menus by inherited regional and racial traditions. Individuality and variation are gradually disappearing in favor of uniformity and efficiency of operation. Who is the loser? I believe we all are. If a people begins to eat for nourishment only instead of really enjoying the pleasures of the table, food consumption invariably decreases and many products disappear from the market. To illustrate this point, we have only to remember that herbs and spices which were plentiful in the pioneer kitchen have been reduced to a minimum, and that their proper and skillful use has become a practically extinct art. The Indians planted 158 varieties of corn, all said to have possessed specific flavor characteristics as well as many colors, including red, blue and black.

"Where is my technical stooge? Now, quit your kidding. And seriously. about this production problem of yours, I think I have the answer."—Most successful sales representatives of the leading food companies are either chemists or engineers, well versed in the manufacture and application of the products they sell.

Broad View Important

You will ask by now: What has all this to do with "The Technical Stooge"? The answer is: In many cases the technologist is degrading himself to this position by his lack of imagination and initiative. If the food chemist, bacteriologist or engineer has not asserted himself to the same recognition as the sales and advertising departments, it is largely due to his unfamiliarity with industrial customs and trade practices. Many a chemist is unaware of the commercial implications of his findings and thus unable to bargain for his rightful share of the profits he helps to accumulate. Most of the blame for this situation must be laid at the door of our educational institutions, as was brought out clearly in the discussion of this subject by the Institute of Food Technologists at its annual meeting in Pittsburgh last June.

Fundamentally, the problems which are most likely to arise between the technical and other departments within or between plants often involve no more than the inability of common understanding of a common purpose.

The Eternal Triangle

At the bottom of most controversies of this nature seems to be the eternal triangle—scientist, production technologist and management. Only in exceptional cases do these three speak the same language. Controversies are usually readily resolved, or at least mitigated, once the function of each is clarified within the scope of the business enterprise. A definite sphere of duties and responsibilities should be outlined and insisted upon by the management to prevent overlapping and duplication, as well as to avoid resentment by the personnel involved. Loose phrases and misconceptions of technical nomenclature and terminology invite misunderstandings within the plant as well as between buyer and seller.

A clear statement of what is wanted and a detailed description of the circumstances under which the product or equipment is to function permit the selection of those means best adapted to the needs. In like manner, an honest and frank presentation of quality, performance and conservative claims, combined with a receptive mind for the user's requirements, will overcome many difficulties.

Secretiveness and insufficiently known facts account for more failures and disagreements than any other factor. Systematic cooperation in the solution of a problem by all concerned removes conditions which lead to controversies and dissatisfaction.

If the chemist or food technologist has initiative in creative activity, combined with imagination and the ability to translate and fit his findings into practical production problems, he will be able to prove his value and will not be denied his just reward. If in due course his company does not appreciate his contributions, he is wasting his time.

Canned Whey Pudding —A New Product

By H. H. BROWNE and B. H. WEBB

Division of Dairy Research Laboratories, Bureau of Dairy Industry, U. S. Department of Agriculture, Washington, D. C.

Here is a new use for whey, an old byproduct. Such a development is significant with defense calling for more efficient use of national resources. The author gives complete directions, and his article may suggest other uses of a low-cost material.

WHEY, the byproduct from the manufacture of cheese and casein, contains approximately half of the solids of milk, including almost all of the milk sugar, salts, albumin and water-soluble vitamins. Only a small part of the whey produced annually in the United States is utilized as human food; a small part is discarded and the remainder is fed to livestock. This paper describes the process of manufacture of another food product that may be added to a growing list of prepared foods containing whey solids.

This newly developed whey product is a pudding that differs from conventional canned plum pudding and canned nut bread or brown bread. It is an intermediate product, with less shortening and richness than plum pudding but more cake texture and sweetness than the canned breads.

The pudding, as finally produced, possesses certain desirable characteristics that are derived from the whey solids. Whey gives it a pleasant and distinctive flavor that cannot be obtained with other materials, within the price range of whey solids. The mild acidity of whey is of advantage since through the use of sodium bicarbonate, carbon dioxide is released for leavening. During processing of the pudding an attractive dark color is developed as a result of the caramelizing action of heat upon the lactose in the whey. Whey albumin is effective in improving body and producing a cake-like texture in somewhat the same manner as does egg white. Whey pudding is high in nutritive value. The contribution of whey solids to the development of an attractive pudding was shown in a striking manner, by preparing samples of puddings with the same composition as the whey pudding, except that the sample puddings lacked whey solids. This whey-less product had a poor flavor, a light, bleached color and an unattractive dense body.

In the experimental work sweetened condensed whey[1] was used as a source of whey solids. Plain condensed or dry whey could be used if these forms of whey were converted into the sweetened condensed product by adding the required quantity of water and sugar. The sweetened condensed whey contained 40 percent sucrose, 40 percent whey solids and 20 percent water. It was made from fresh cheddar or Swiss cheese whey, from which the butterfat had been removed by centrifuging. A quantity of sucrose equal to the weight of whey solids was added to the separated whey; the mixture was then pasteurized and concentrated by vacuum evaporation to 80 percent total solids. The pH value of the sweetened condensed whey was between 5.0 and 5.8.

The fat used in the puddings was a hydrogenated vegetable shortening of commercial manufacture.

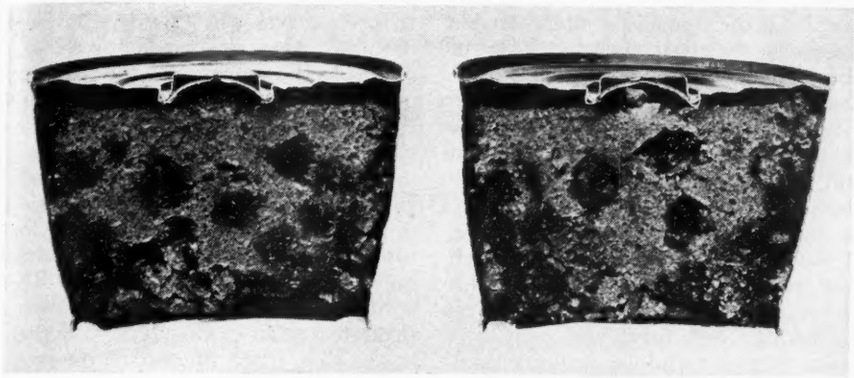
Common flavoring materials, such as mace, cinnamon, nutmeg and other spices, were used in quantities to suit the taste. When raisins were used, they were soaked for several hours with half the water specified in the formula. Banana flavor was obtained through the use of a commercial dehydrated banana flour.

Sodium bicarbonate was used both to raise the pH value of the batter to between 6.0 and 7.5 and to produce gas for leavening. It was observed that the best flavored product was obtained when the pH value of the mixture was raised at least to 6.0. Puddings made without raising the reaction to or above

Formulas and Processes Developed in Experimental Work With Whey Puddings[1]

Formula No.	Flour		$NaHCO_3$	Fat	Sweetened condensed whey	Water	Raisins	Net weight of batter in can	Type of tapered pudding can	Process: Oven 300°F. Rising time	Process: Oven 300°F. Baking time	Process: Retort 212°F. Rising time	Process: Retort 250°F. Holding time
	Type	Parts[2]	Parts	Parts	Parts	Parts	Parts	Grams		Min.	Min.	Min.	Min.
1	Hard	1,000	12	160	1,200	600	800	330	Plain Valve	67	60	90	62
2	Soft	1,000	8	160	1,200	200–400	700	384	Plain	49	67		
3	Soft	1,000	8	320	1,200	400	800	350	Valve		111		
4	Middlings	1,000	12	160	1,800	400–600	800	350	Plain Valve	60	70	90	60
5	Soft Bread crumbs	500 500	12	200	1,200	1,000–1,200	1,000	300	Valve	60 at 270°F.	80		
6	Bread crumbs Banana flour	500 500	12	400	1,200	1,000	....	300	Valve	60 at 270°F.	75		

[1] Formulas 5 and 6 produced the most satisfactory products, and are the only ones recommended for commercial trial.
[2] Parts are by weight.



Cross-sections of valve-type can containing whey pudding, showing texture and consistency of the product developed to utilize whey solids in foods. The pudding, which has a pleasant and distinctive flavor, a mild acidity and an attractive dark color, is high in nutritive value.

pH 6.0 retained an undesirable flavor that was carried through from the whey.

Whey puddings were made with both bread and cake flour. Little difference was observed in the results obtained with the two types of flour, although there was a tendency for the softer flour to produce a more cake-like texture.

Laboratory formulas and processing data are given in the accompanying table. These formulas are only a few of many which were developed. Only formulas No. 5 and No. 6, which represent the best products obtained during this work, are recommended for commercial trial.

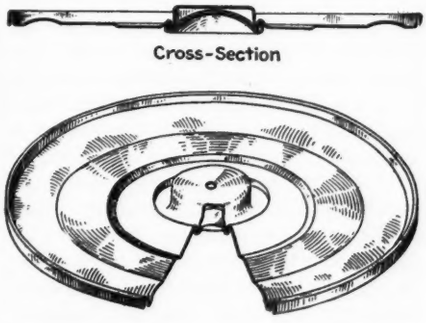
Although whey pudding has been processed successfully in No. 1 and No. 3 cans with plain covers, the valve-type lid shown here seals the tins immediately after filling and automatically exhausts them during processing. The valve withstood the heating temperatures and held a vacuum up to 28 in. during storage.

Working Directions

The procedure used for mixing the pudding ingredients was as follows: Bread crumbs and half the water (the water not required for soaking raisins) were mixed until the water was absorbed. Flour that had been previously mixed with sodium bicarbonate, melted shortening, sweetened condensed whey and the water from the raisins were successively added to the mix. During these additions the mixture was stirred slowly with a mechanical mixer. Mixing was continued until the batter appeared uniform; the raisins were then added and the mixer was run about two minutes longer.

When seeded raisins were used, they were added only after the mixing had been almost completed; otherwise, disintegration of the raisins took place. Seedless raisins withstood more vigorous mixing than the seeded variety.

The thickness of the batter was determined by the quantity of water used. The rate of rise of the batter in the can was influenced in part by batter thickness. It was not desirable to have such a rapid rise that the material flowed over the edges of the tin or, in the case of a valve-type can, plugged the valve. A mix of optimum thickness consisted of an almost free-flowing batter. Cans were filled by hand but the nature of the batter was such that machine filling could be utilized.



Details of valve in special valve-type can used for canning whey pudding. Developed for canned cheese, the vented container can be used for the pudding or other products requiring an exhausting period. Pressure inside the can, or a vacuum outside it, raises the rubber disk and permits air or gas inside the can to escape. When the pressure is relieved, the disk returns to position and seals the container.

Two Types of Containers

Cans of several types were used but most of the batches were processed in the conventional tapered pudding can. The diameter of the lid of this can was 4 4/16 in.; the height of the can was 2 15/16 in. and its volume was 480 c.c. This is the commercial 404 x 215 can. Puddings cooked satisfactorily in this can when a plain lid was sealed in place after the gases were properly exhausted. However, experiments were conducted to adapt a special valve-type can[2] to the processing of puddings or other products which required an exhausting period before sealing. The valve, sealed in the can cover, was designed to allow the escape of gas from the container but to prevent the entrance of air into the can. It was manufactured primarily for curing cheese in a can. The operating principle of the valve, together with its application to the curing of cheese in a sealed package, is given by Rogers.[3] In the experimental work on the manufacture of puddings, when the valve-type can was used it was not uncommon to have up to 28 in. of vacuum after the pudding was properly processed. Whey puddings were also successfully processed in No. 1 (211x400) and No. 3 (404x414) cans with plain covers.

Processing was carried out either in an oven or a retort. Puddings processed in plain tins were given a rising time or exhaust time of approximately 60 minutes, which allowed for the escape of gas in the unsealed can. At the end of the rising period the can was

sealed quickly and the processing finished.

[Commercial processing of canned puddings in ordinary types of cans utilizes the steam retort rather than the dry oven method of heat treatment in the following steps:

1. Clinch the covers loosely on the cans by the use of a loose first-operation seaming roll on the can closing machine. The second operation is omitted entirely at this stage. Do not allow contents to come in contact with the lids through tipping over.
2. Process the cans upright in steam retorts at temperatures from 215 to 220 deg. F. for an hour or longer, depending on the size of the container.
3. At end of heat treatment, remove cans and allow to air cool a very little. Then run them through the closing machine with rolls set for normal operation, *i.e.*, a tight first operation and tight second operation. The purpose of the air cooling is to allow sufficient air to enter the can to reduce the vacuum to a point where paneling of the can will not occur.

Since the commercial procedure for retort cooking differs from the experimental methods used here, small adjustments in formulas Nos. 5 and 6, especially in water content, will probably be found necessary.]

When the valve-vented can was used it was sealed as soon as the can was filled with mix. During the first hour of oven processing the temperature was generally held at 270 deg. F. to allow the mix to rise slowly. Rapid rising of the pudding during the early stage of processing caused the valve to become plugged, thus preventing escape of the gas formed. Cans with plugged valves bulged during the final stage of processing. A fine coordination of the factors which control the height to which the batter will rise in the can must be observed in order to allow proper functioning of the valve.

The various types of puddings referred to in the table differed in body, texture, flavor and keeping quality. The puddings were examined after storage at room temperature for periods of time up to nine months. There was no noticeable bacterial growth in the product during storage.

The texture of all the puddings was soft, tender and moist after processing, but during aging at room temperature a dryness and crumbliness gradually developed. The defect was apparently caused by an irreversible change in the starch similar to that which is known to occur in the staling of bread. Freshness could be temporarily restored to such puddings by thoroughly heating them in hot water before opening the can.

The range of concentration of lactose in water in most of the whey puddings was 20 to 30 percent. In the best product, pudding No. 5, it was 21 percent. Lactose crystals of objectionable size were observed only in some of those puddings of high milk sugar concentration that showed a dry texture. Crystalline lactose was not noticeable in stored samples while they were still soft and moist. Although the crystallization of lactose may have contributed to the development of a dry texture, it was felt that a change in the starch was principally responsible for this defect.

Puddings were made with corn sirup in an attempt to inhibit lactose crystallization and to improve the moisture-retaining qualities of the pudding crumb. Corn sirup, however, was not helpful in improving the body and texture of the puddings.

It was then noticed that those parts of a pudding which were in close proximity to raisins did not show the crumbly texture. This appeared to be due to the high levulose content of the raisins and the diffusion of this sugar into the crumb. Nevertheless, when puddings were made with condensed whey sweetened with invert sirup in place of sucrose, processing difficulties were encountered and the texture after storage was not materially improved.

Types of Flour

The flour puddings (Nos. 1, 2 and 3), which were the only type made during the early work, developed a short, crumbly texture in two months. When bran or middlings was substituted for flour, a pudding which retained a soft and moist texture for about four months was obtained. This product is given in the table as formula No. 4. The shelf life of whey puddings was prolonged to at least six months by substituting bread crumbs for part or all of the flour used in the other formulas. Bread-crumb pudding formulas are given in the table as Nos. 5 and 6. After storage periods extending from six months to one year, the eating qualities of these puddings were improved by heating them to restore their freshness before opening the can.

Formula No. 5 produced the best pudding. Its percentage composition was as follows:

	Percent by weight
Flour	11.1
Bread crumbs	11.1
$NaHCO_3$	0.2
Shortening	4.4
Raisins	22.3
Sweetened condensed whey:	
Whey solids	10.6
Sucrose	10.6
Water	5.3
Added water	24.4

This batter lost only a few grams of water per can during oven processing. The final pudding contained approximately 70 percent solids, of which 15 percent was whey solids. Exclusive of raisins, whey solids made up 22 percent of the solids of the finished product.

Interior Corrosion Problem

In certain circumstances some difficulty was experienced with corrosion of the tin plate during storage. Corrosion in properly sealed tins occurred only when raisins were present. The corroded areas on a can were always opposite a raisin in the pudding. Seeded raisins were much more likely to cause corrosion than the seedless variety. Thorough greasing of the tin before the batter was poured in helped to minimize corrosion, but for this purpose it was found important to use a fat that would not become rancid during storage. The production and maintenance of a high vacuum in the sealed tins was effective in reducing corrosion of the tin plate.

Flavoring

Puddings of several flavors were made. Raisins and nuts were especially helpful in producing desirable flavors. Figs, dates or other fruits could be used. The banana flour used in pudding No. 6 gave a product with a pronounced banana flavor. This flavor remained stable for the six-month storage period to which the banana puddings were subjected.

The cost of the ingredients of the whey puddings given in the table was between 3 and 5 cents per pound. This allows 5 cents per pound as the value of sweetened condensed whey with a water content of 20 percent. The market prices of the other ingredients were used in making the calculation. The common pudding can was found to hold approximately 10.5 oz. (300 grams) of this product, the loss of moisture from the batter during mixing and processing being 1 to 3 grams per can. In view of the price at which a product of this type is sold in the retail trade, there appears to be ample allowance for a reasonable profit in its manufacture.

It is probable that whey could be used profitably in several products which might involve modifications of the whey pudding formulas. Manufacturers already producing goods similar to whey puddings may find that the addition of 5 to 10 per cent whey solids to their present formulas will improve them.

Possibility of Dry Mix

A dry mix might be made by using the formulas given, as a working basis for the development of such a product. It would be necessary to use care in

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British Food Industry Develops New Ideas

By ERIC HARDY, Liverpool, England

Under the pressure of total war, England's food factories have worked out new products, processes, ingredients and equipment. Some of these will affect the post-war picture and some may be useful in this country.

DESPITE the very great difficulties of total war, the change-over to women workers and increased taxation, the British food industry, particularly the canning industry, continues to develop new ideas and processes for both home markets and export. The canning industry is endeavoring to make more use of rabbit and home sources of meat. These include grey squirrel, venison and duck and also wild fruits not usually exploited in peace times. This development will probably leave new lines for a post-war export industry. Canned mangoes, lichees and guavas, unknown in England before the war, have been introduced from India. Poppodums, a biscuit made from grain flavored with pepper and salt; sesamum, a sweet made from crushed oil seed and sugar; the famous Bombay "duck"; and sun-dried fish also are coming from India. Mutton, sheepshead and leek soups from old Scottish cottage recipes have now been marketed in modern packs. Milk factories are producing canned rice pudding.

A highly efficient small steam turbine running at 4,000 to 6,000 r.p.m. is finding favor in many canning and other food factories. Its main advantage is that it operates well either as a condensing set or as a pass-out or back-pressure set. It is designed for either a direct drive or to operate a chain, rope or belt drive through reduction gears. The size and weight of the machine are small per unit output.

Fortified white bread, different from the government type, is being produced by at least one bakery. This bread is equal to whole-meal bread in vitamin B_1 content, being fortified with a natural compound and not a synthetic form of the vitamin, and is a result of three years' research.

The Research Association of British Flour Millers and other associations have made important discoveries. They have learned that mechanically damaged starch produced during milling is a governing factor in the diastatic activity of flour and that potassium bromate has value as a flour improver because of its slow rate of oxidation of glutathione.

It has been found that 16 percent moisture is the critical stage for mold growth in stored flour and 15 percent or less should be adopted, with a relative humidity not above 80 percent. Approximately 30 deg. F. has been found the best storage temperature for compressed yeast. The after-ripening process of wheat is increased by one month if the harvested wheat is exposed for 3 days to air containing 1 part of ethylene to 1,000 parts of air. It has further been shown that the baking of dough destroys 15 percent of the vitamin B_1 content. By simple and accurate measurements a photoelectric fluorimeter estimates vitamin B_1 and B_2 content by a null method independent of personal error. The instrument is the Spekker photoelectric fluorimeter.

Investigations have shown that the plankton or minute surface life of the sea may yet prove a valuable source of oil, carotene, chlorophyll and vitamin A. Soya lecithin is being used in small quantities to reduce the viscosity of chocolate mixes. It is also used as an emulsifying agent for an ice cream substitute made from vegetable (palm) oil and egg yolk or concentrated milk powder and other ingredients. Two percent of lecithin is mixed with 5 percent of monoglyceride derived from fully hardened palm oil and dissolved in liquid vegetable oil. The liquid vegetable oil is gradually dispersed in an egg yolk or concentrated milk powder suspension and the other ice cream ingredients incorporated before freezing.

Sugar, which is rationed, is being replaced or supplemented with a liquid sweetener containing specially processed saccharin (benzosulfinide) and glucose in an edible base. This is replacing the whole of the sugar normally used in yeast doughs, custards, scones and rock cakes, and is replacing 50 percent of the sugar used in cake mixes with the exception of sponge cake. Bakers are using yeast in cakes at the rate of ½ oz. to 10 lb. flour. This is added to split up the gluten into simple proteins in the same way as sugar works. Poppy seed oil is also being exploited for cake mixes and other mixes to which it is well suited.

Centrifugal separators are now being used to separate blood serum for use in sausage manufacture; for the recovery and purification of damaged butter fat; the separation of vitamin extracts; recovering neutral oil from soft soap in vegetable oil refining; for filtering frozen eggs; reclaiming oil from offals; and recovering crystals.

British-Combine

The British food factories have made many changes in products and methods, both because of and despite the war, increased taxation and change-over to women workers. Here are women at work in a blackberry canning factory at Toddington.

Yeast extract, rich in vitamin B, is used in making concentrated foods like canned soup and beef cubes, gravy powders, savory cheese and sandwich spread, cooked meats and other types of food. Vegetable extracts with high amino acid content are used to enhance the characteristic flavor of foods. Allyl chloride is used for the synthesis of mustard oil; garlic, pineapple and isopropyl alcohol for odor and taste in essences; methyl ethyl ketone for the synthesis of diacetyl; secondary butyl alcohol for the synthesis of raspberry; and tertiary butyl alcohol for the synthesis of musk.

Tin Research Institute, Middlesex, has provided some useful information for the canning industry by showing that electro-tinning is the best process of tin plating for certain copper alloys containing aluminum, such as aluminum bronze, and for brass.

School Paves Way for Spectacular Expansion Of Dried-Egg Industry

By E. S. STATELER
Associate Editor, *"Food Industries."*

Technology and economics of industry are outlined at three-day session by authorities from government, universities and egg-drying companies. Processing, quality control, sanitation, costs, raw material and packaging discussed

UNPRECEDENTED in the egg and poultry industry, possibly in all American industry, the Dried Egg School held in Kansas City, Mo., September 25 to 27, set a new high level in industry and industry-government relations.

In those three days an infant industry took stock of its technological assets and laid the groundwork for potential healthy growth into a full-fledged state of maturity. Whether such a miracle can be performed depends much on how seriously the newcomers in the industry heed the warnings given and how successfully the pioneers in the field are able to rationalize and integrate their collective experiences and knowledge.

The school was sponsored by, and held under the auspices of, the Surplus Marketing Administration, Washington, D. C.; National Egg Products Association, Chicago, Ill.; Department of Poultry, University of Missouri; and Missouri Agricultural Extension Service, Columbia, Mo.

The reason for the school is the spectacular expansion of the domestic egg-drying industry from a production capacity of approximately 9,000,000 lb. of whole eggs on January 1, 1941, to a projected total of more than 150,000,000 lb. in 12 months' time. Under the spur of necessity, pioneer producers of domestic dried eggs had driven their existing plant capacity to the production level of 17,000,000 lb. by July 1 and had committed themselves to plant expansions as rapidly as priority releases could be obtained for plant and equipment construction materials.

In his admonitions on opening the school sessions, W. D. Termohlen, Surplus Marketing Administration, Washington, D. C., explained that as much as 100,000,000 lb. of the whole dried eggs to be produced are intended for Lease-Lend purchasing and must stand up under storage conditions for as long as two years without deterioration, be packaged according to specifications both for composition of product and for container, and be deliverable by as near July 1, 1942, as supply of shell-egg raw material will permit.

For the Lease-Lend program of dried whole egg production alone, approximately 300,000,000 doz. of shell eggs is required. Add to that the dried whole eggs, whites and yolks needed for domestic use and a total of approximately 500,000,000 doz., or 15,000,000 cases, of shell eggs will be needed for 1942 dried-egg production. To that end, every farm is being visited by government agents to complete a survey on the potential supply of shell eggs. Quotas for increase in production have been set for each state, some quotas being as high as 18 to 20 percent over 1941 production.

Specifications of the dried whole egg, which now permit a moisture content as high as 8 percent, are to be revised in the light of findings and recommendations of the technical committee of National Egg Producers Association. A tentative maximum content of approximately 5 percent moisture has been recommended as the basis of government buying until more definite specifications can be set.

Mr. Termohlen informed those present that heretofore the egg-drying industry has been on an experimental basis and that present plant capacity is sufficient to produce only 50,000,000 lb. per year if operated 20 to 24 hours per day, 360 days per year. As of July 1, 1941, 17,000,000 lb. had been produced although only 5,000,000 had been bought by the government.

Capacity To Exceed 150,000,000 Lb.

Beginning with a quietly held conference on June 25, a dried egg program was set up for tripling the then existing plant production capacity. Headway has been made to the extent that by September 1 of this year contracted plant production capacity, to be in operation by January 1, reached a total of 150,517,000 lb. of dried eggs. Since September 1, another plant having an annual production capacity of 2,500,000 lb. has been reported. With such ample production capacity in sight, no more Certificates of Necessity are obtainable from the Surplus Marketing Administration for the purpose of getting a preferential priority rating on construction materials and equipment. Also, attempts to change additional dried-milk plants over to dried-egg production are being frowned upon, and no help is, or will be, given to facilitate such change-overs. Dried milk is also wanted, and attempts to shift because of the relative high price being paid for dried whole eggs will lead to no advantage because present prices for eggs are not likely to be continued once the present plants contracted for come into production.

Lack of encouragement for building the dried-egg production capacity above that now contracted is based on potential peace-time market for dried eggs.

Heretofore, the domestic consumption of dried eggs has been approximately 15,000,000 lb., including imports.

Since the 150,000,000-lb. plant capacity to be in operation by January 1 involves operation for 360 days, 22 to 24 hours per day, there will not be any extra production capacity when the industry goes back to a peace-time basis of an 8-hour day and a 4-month season, as has heretofore characterized the egg-freezing and drying industries. Under those peace-time conditions, the total plant production shrinks to approximately 17,000,000 lb. The 2,000,000 lb. in excess of previous domestic demand will be available for new uses for dried eggs or for export purposes; both possibilities are under consideration by those planning ahead.

Mr. Termohlen also emphasized that plant expansions are not being made in southern areas from which existing plants draw their egg supply, but rather in northern areas from which eggs have been shipped previously or have not been produced in industrial quantities.

As a source of information on background and problems of the dried egg industry, A. W. Doell, Swift & Co., president of the National Egg Producers Association, called the attention of newcomers in the industry to U. S. Department of Agriculture Circular No. 583, entitled, "Egg and Egg Products." This may be obtained from the Superintendent of Documents, Washington, D. C., for 15 cents in cash.

Cost Data Given

Attention was focused on problems of cost, attainment of a quality product and building of a domestic industry for peace-time permanence. W. F. Leimert, Tranin Egg Products Co., broke approximate costs down into factors of raw materials, including storage, breaking labor, drying, amortization of plant, and administration:

1. Assuming an average yearly cost of 30 cents per dozen for eggs and a yield of 10 lb. of dried whole eggs per 30 doz. case, the raw-material cost becomes 88 cents per pound of dried eggs. If eggs are to be stored for drying during winter, or out of the heavy-laying period, a storage cost of 10 cents per case per month, or 1 cent per pound of powder, should be taken into consideration.

2. Breaking costs, including labor and supplies, were given as 1¼ cents per pound of liquid eggs broken, or 5 cents per pound of powder.

3. Drying costs, including power, fuel and packaging materials, totaled 4 cents per pound of powder.

4. Amortization of plant costs, set up on a one-year basis because of 24 hour per day operation, was calculated to be 2 cents per pound of powder.

5. Administration expense of 2 cents per pound of powder brought manufacturing costs to a total of 13 cents per pound; added to the raw materials cost of 88 cents, the total cost for the powder becomes $1.01, figured on a year-around shell-egg cost of 30 cents per dozen. Warning was given that the prices being paid by the government at present should not be taken as a continued price for the calculation of a possible profit.

Production Pointers

D. A. Meeks, Armour & Co., cautioned against minimizing problems of production. Years of experience have proved the value of controls regardless of drying methods used. These suggestions were made:

1. Good wholesome eggs, the first requirement.
2. Plant must be maintained in good sanitary condition.
3. Close supervision must be maintained over breaking operations.
4. Selection of equipment used influences yields obtained.
5. Follow through for maintenance of quality of finished product essential to retention of peace-time market.

V. W. Henningsen, Henningsen Bros., Inc., cited the importance of a properly equipped and capably staffed control laboratory to operate as many hours per day as plant is in production. Perishability of liquid egg between point of breaking and point of drying must be considered and held to minimum. Positive control over moisture content of finished product was evaluated as essential to its stability during shipping and storage whether under refrigeration or at normal room temperatures.

Albert E. Epstein, Emulsol Corp., stressed:

1. The importance of making a dried-egg powder to meet the demand of wartime conditions, which requires more rigid specifications and higher standards than previously considered necessary for domestic peace-time uses. For those previous uses the handling and storage period has been short.

2. The enzymic deterioration of eggs that have low bacteria count, even to being bacteriologically sterile.

3. The effect of copper, bronze and iron contamination upon the oxidization of yolk fat and development of rancidity.

4. The importance of using stainless steel equipment and critical examination of any secondhand equipment offered for sale.

Composition of the egg, means of retarding its deterioration, reasons for fermentation of whites before drying, properties of yolk and whites, bacteriology of eggs, necessity of sanitation, good housekeeping and technical control and danger of excessive drying, as well as of insufficient drying, were dealt with by H. E. Goresline, Bureau of Agricultural Chemistry and Engineering, when he discussed "Science and Its Contribution to the Dried Egg Industry."

Presence of 0.4 percent of sugar in unfermented egg whites was given as the reason for darkening during storage.

Egg-drying school in session at Kansas City.

Fermenting for removal of this sugar results in an increase in acidity and a thinning of the thick portions of the whites so that the mucin content may be removed and the liquid whites easily handled into the dryer. Egg whites are germicidal to many bacteria, whereas the yolks are easily susceptible to bacterial contamination and decomposition. Shell eggs, generally sterile when laid, become contaminated during handling and storage. They are particularly susceptible to contamination when taken from refrigerated storage into a room in which condensation of water vapor upon the shells takes place and are handled or allowed to come in contact with bacteria-laden surfaces. Small percentages of freshly laid, bacteria contaminated eggs are puzzling. During inspection they may be passed as sound eggs if the bacteria happen to be non-proteolytic and produce no odor.

High Quality Essential

Mr. Goresline cited high labor and egg costs as cause for failure of the earlier American dried egg industry and mentioned low quality and tariff restrictions as causes for the break-up of the Chinese industry and revival of the American industry. The new American industry is, and must be, built up on a basis of high quality, mechanized production operations and technical control to obtain desired color, odor and eating qualities. The technical control thus far obtained over dried eggs has been largely adopted from the technology of other foods, particularly from the drying of milk. Excessive dehydration of eggs, like the over-drying of milk, lessens their solubility for reconstitution. Particle size is not considered as important as getting and maintaining the correct moisture content, preferably not less than 4 percent and not more than about 6 percent. Control tests taken several times are recommended as a means of establishing a uniform and desirable moisture content.

During the session on procurement problems, Prof. F. M. Funk, Department of Poultry Husbandry, University of Missouri, reminded newcomers in the industry that the quality of the dried eggs cannot be higher than that of the eggs used. He stresssed the importance of breeds of hens, hen feeding, freshness of shell eggs and systematic cooling of shell eggs to get quality and its retention in shell eggs. For cleaning dirty eggs, dry methods were declared unsatisfactory, whereas the use of 1 percent lye water is considered a good wash and without adverse effect upon storage properties or edibility of the eggs.

Three Grades Recommended

A panel discussion on procurement brought out difficulties that the dried-egg program is causing in the marketing of eggs in the Midwest. Past efforts to obtain a grading system for egg marketing, patterned after the milk-marketing program, have already been greatly endangered as a result of No. 1 extra eggs being heavily bought up last spring for fall drying. Recommendations were made to have eggs classified as table eggs, freezing eggs and drying eggs. Then, as fresh eggs come onto the market, they may be graded into these classifications.

A quality egg program has been under way for the past three to four years and was beginning to show promising results previous to the launching of the dried-egg program. Behind the quality egg program is the desire to stabilize the production of eggs, as may be possible through encouraging heavier production of eggs during winter months. By combining the egg-drying program with the egg-grading program, there is the possibility of leveling market egg prices so as to avoid the 8 to 10 cents per dozen differential between the U. S. Select grade and the U. S. Standard grade during the winter months as compared to the 2 to 3 cents per dozen differential during the four spring and early summer months when approximately 50 percent of the present yearly supply of eggs is produced. The egg-drying program has already resulted in an indicated increase of 8 to 10 percent in the laying-hen population of Iowa, Kansas and Missouri; pullets and old hens are being withheld from the poultry market in anticipation of an increased winter demand for eggs.

Methods of drying, types of equipment and engineering principles used in the drying of eggs were embodied in presentations by C. M. Weaks, Douthitt Corp.; C. E. Rogers, Rogers Mfg. Co.; J. W. Hall, Cardwell Westinghouse Co.; and C. E. Barnhill, Portland, Ore. Methods and equipment discussed involved batch and continuous procedures, specially built and converted units, direct and indirect application of dry heat with and without preheating of eggs, and formation of film or spray to bring egg meats into intimate contact with drying heat.

Good Practice Defined

During the plant-operation phase of the engineering and technical session, C. E. Sidler, fieldman of the Surplus Marketing Administration, defined good egg-breaking practice as being no more than good plant housekeeping. Adequate refrigeration, sterilizing supplies and equipment, and kitchen or washing facilities were stressed as being of particular importance to a well-operated egg-breaking and drying plant. Simplicity and speed in the breaking operation play a large part in holding breaking costs low and in cutting the loss of egg into drip pans where likelihood of contamination is great. The breaking room is the last station of inspection at which off-flavor, off-color and off-odor eggs are likely to be caught before being dried. Not only should all broken-out eggs be carefully inspected before being sent to the first processing station, but they should be weighed in and lots kept separate so that the acceptable eggs broken out may be checked back against receipts to determine correct raw-egg costs and to establish a representative breaking labor cost.

In discussing sanitation in egg-breaking and -drying plants, H. E. Goresline emphasized that sanitation is not all bacteriological in character. The objectionable condition that may develop, in which microorganisms play a part, may be avoided through the physical and chemical aspects of housekeeping, cleaning and care of equipment and a common-sense attitude on part of plant employees and management. Generally, eggs, like most food products, become bacterially contaminated only when mishandled.

The fact that neither pasteurization, sterilization nor drying procedure is a substitute for cleanliness was stated by Albert Epstein of Emulsol Corp., in his explanation of the role played by heat application in egg drying. Preheating of liquid eggs up to 137 deg. F. before drying is possible because of the buffering action of the yolk content. But thickening will take place at that temperature and may interfere with flow of the eggs through the lines and spray nozzles.

Also, pasteurizing temperature may result in the growth of thermophilic bacteria to give the dried eggs a higher bacteria content than they otherwise would have. This word of caution is particularly pertinent because bacteria in eggs are most likely to be of the soil types and capable of withstanding pasteurization temperature. Knowledge of pasteurization comes largely from the milk industry but is not altogether applicable in the treating of eggs because of the differences in the composition and behavior towards heat of the two commodities. For that reason, much study on the heat treating of eggs preparatory to drying needs to be done before definite conclusions can be drawn.

(*Turn to page 95*)

ENGINEERING

More Efficient Use of Heat Saves Fuel and Aids Production • New Birdseye Quick Freezer

Better Heat Use Speeds Process, Aids Quality, Saves Fuel

By G. L. MONTGOMERY
Associate Editor, "Food Industries"

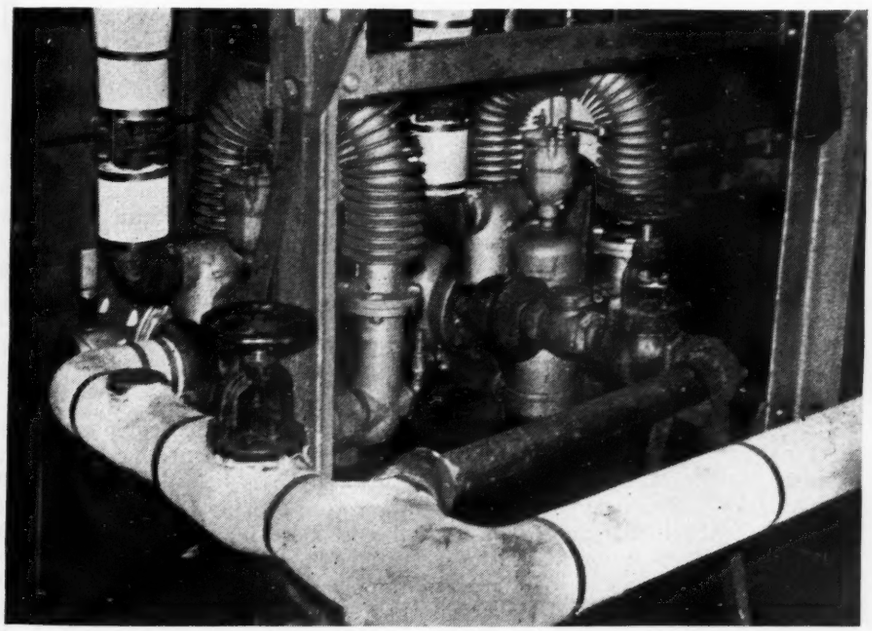
Increased output of cookers, better boiler operation and direct fuel saving follow installation of high-pressure condensate-return system

"A PENNY saved is a penny earned," said old Ben Franklin, and what he said applies as much in the food processing plants as in one's personal finances. Unfortunately, though, too many food manufacturers have been so interested in buying raw materials at a favorable price, processing them into products of the desired quality and then selling at a profit over manufacturing costs, that they have overlooked some minor plant improvements that can produce real savings.

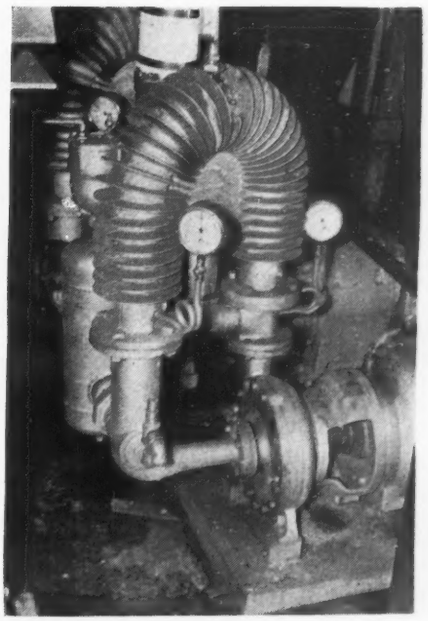
This is particularly true of the applications of steam for process purposes. Such things as unlagged steam pipes, leaky steam valves, exhaust blown to the atmosphere with consequent loss of heat, pressures unsuited to the heating process, and poor combustion at the boilers are commonplace in many food plants. And these neglected opportunities for heat saving too often also mean reduced output and uncertain quality of product.

What can be accomplished toward improving plant operations and effecting a reduction in costs through better steam utilization has been demonstrated at the plant of P. J. Ritter Co., Bridgeton, N. J. This company recently installed a high-pressure condensate-return system. After operation through only part of the current canning season it is already evident that the results are saving in processing time, improved product, more even boiler operation with better control of boiler water level, higher steaming capacity of boilers because of higher feedwater temperature, and definite savings in boiler fuel. While the direct fuel saving alone is sufficient to pay for the improvement in a short time, it is apparently exceeded by the savings made through steady plant operation and greater output from the processing equipment.

Tomato products are the most important products of the Ritter plant, although asparagus, baked lima beans and other products are also made. Among the tomato products, catsup is a leader, and the application of the high-pressure condensate return to catsup processing will serve to show how the savings have been made.



Two condensate-return units installed this year at Ritter plant. The vertical covered pipes deliver condensate to the units, while the horizontal covered pipe takes condensate from pumps to boiler.



Close up of condensate-return unit, showing pressure gages on suction and discharge and thermometer at top of loop.

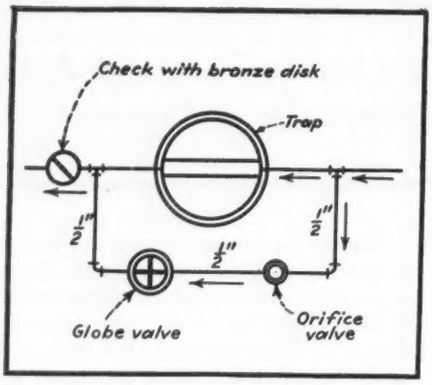


Fig. 2. Pipe connections at trap, showing trap bypass and orifice valve used with high-temperature condensate-return system.

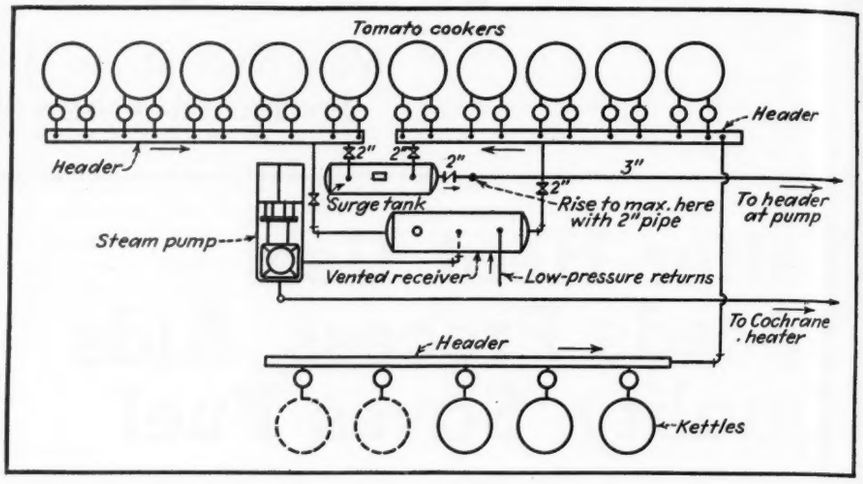


Fig. 1. Diagram of condensate lines from pulp kettles and catsup cookers at P. J. Ritter Co.'s plant in Bridgeton, N. J., showing the old system with condensate pumped to an open feeedwater heater and the new high-temperature return system with condensate pumped directly into the boiler.

In Fig. 1 will be seen a diagram of the condensate piping in one of the catsup processing set-ups. This shows three kettles for heating tomato pulp and ten catsup cooking tanks, arranged in two groups of five each. Originally, the outlets of the heating coils in these pieces of equipment were connected through traps to headers, as shown. These headers, in turn, drained to a vented receiver, from which the condensate was returned to the open feedwater heater by a steam pump.

This equipment is still in place, as a standby, the new high-pressure condensate return having been added without disturbing it.

In the new system the first step was to bypass each trap, as shown in Fig. 2. In this arrangement, a bypass with an orifice valve and a globe valve was connected around the trap and a check valve was installed in the return line beyond this bypass.

Referring again to Fig. 1, it is seen that the headers already referred to were also connected to a surge tank. This surge tank, in turn, was connected by piping to the high-pressure condensate-return pump in the boiler room.

Smooth operation of the new system results from the orifice valves installed in the condensate-return lines from each heating coil. When adjusted correctly, these orifices maintain the desired temperature drop through the coils, and at the same time maintain the desired pressure differential between the heating coil exhaust and the condensate-return pump.

How System Works

The heart of this Cochrane-Becker condensate-return system (made by Cochrane Corp., Philadelphia) lies in the pump unit (shown in Fig. 3 with piping connections in Fig. 4). It will be noticed here that the original open feedwater heater is still in use. This serves to heat with pump exhaust and

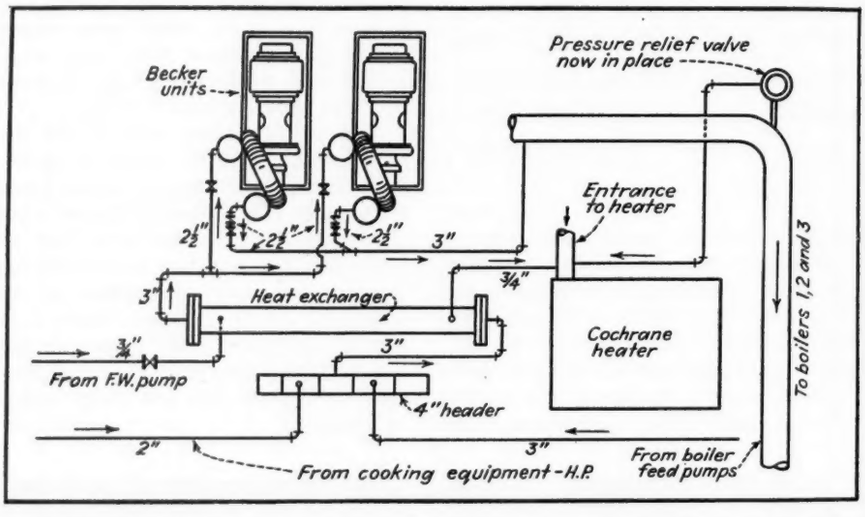


Fig. 4. Pipe connections of the two Cochrane-Becker condensate-return units at P. J. Ritter Co.

low pressure returns what makeup water is needed, although this is relatively small in amount. The original boiler feed pumps are also used to supply this makeup water to the boilers. Both the high-pressure return from the system and the makeup water from the feed pumps are delivered to the feedwater header, whence the feed to the boilers is regulated by the original boiler water-level control.

The pumping unit of the Cochrane-Becker system, as can be seen in Fig. 3, consists of a centrifugal pump and a hydraulic jet pump incorporated in a patented single pumping unit. The discharge from the motor-driven centrifugal pump enters the nozzle of the jet pump, forming the jet. Discharge from the jet pump is into a tube in a loop, connected to the suction of the centrifugal pump.

Both pumps and the loop always operate full of water, therefore the centtrifugal pump is always primed. When no condensate is being returned, water is simply pumped around the loop. The work thus done is dissipated in the form of heat from the fins on the loop, thus preventing the temperature from rising to a point where, at the pressure within the loop, the water could flash into steam.

When steam-heated equipment is in operation in the plant, as for instance, when catsup is being concentrated in the catsup cooking tanks, the action of the jet develops a suction that pulls condensate from the return lines through the strainer shown in Figs. 3 and 4. This condensate is pulled into the loop by the action of the jet pump. But, since the loop is already filled with water, a quantity of water equal

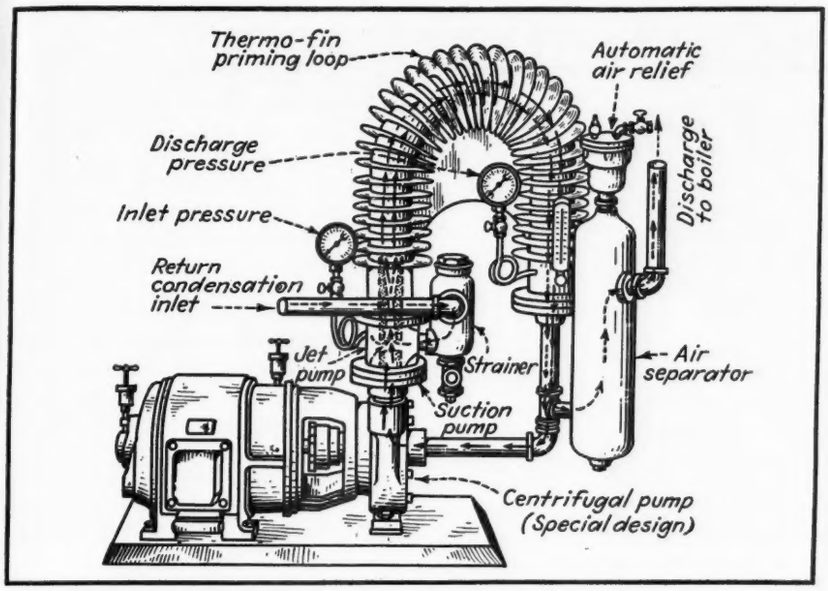


Fig. 3. Diagram showing how the pumping unit of the Cochrane-Becker high-temperature condensate-return system operates.

to the entering condensate is expelled from the loop into the air separator and thence into the boiler feedwater header. The air separator serves to eliminate air from the closed system, thus making operation of the heating coils more steady.

As the quantity of condensate returned by this method is approximately equivalent to the steam used in the heating coils, the quantity of makeup water required by the boiler is always very small. This return condensate is delivered to the boilers at high pressure, and hence its temperature is close to that existing in the boiler drums, in contrast to the temperature of water heated in the open feedwater heater, which must be below 212 deg. F. Actually, at the Ritter plant, the temperature of the condensate return to the boiler varies from 330 to 350 deg. F., which greatly lessens the heat that must be supplied by the boiler to reconvert the condensate to steam at boiler pressure. The work done by the pumps of the unit consists merely of drawing the condensate from the surge tanks and delivering it to the boiler at boiler pressure.

Important Gains Made

As previously mentioned, this condensate-return system has not yet been in operation at the Ritter plant for a full season. But already its advantages are evident. For example, in the catsup cooking operation, the preheated cyclone juice (or pulp) enters the catsup cookers at a temperature around 190 deg. F. For production of a quality product, this tomato pulp must be brought to the boiling temperature of around 213 deg. F. (above 212 deg. F. because of sugar content of the pulp) as quickly as possible. Speed in this operation is helpful in producing catsup of good color.

After the boiling point is reached, the catsup must be maintained at a boil for a sufficient period to boil off enough of the water to produce a finished product of the desired solids content and consistency. With the balanced uniform conditions in the steam and condensate maintained through the use of the high-temperature condensate-return system, each batch is brought to a boil in from 3 to 4 minutes, in contrast to 6 or 7 minutes required before the system was installed. Also, the concentration of a batch (the cooking time) is reduced by around 15 percent, depending upon the makeup of the hot cyclone juice, which varies from time to time.

This saving in processing time is the chief advantage resulting from the use of the new system, for it enables the plant equipment to process that much more product in a given time. This reduces the factory overhead charged against the product, also labor charges.

Another saving is made through improvement in the quality of the product. Avoidance of any burning of the catsup on the coils during cooking, and more rapid processing, give a better product, especially as to color. Also, the uniform conditions that can be maintained with the new system insure greater uniformity of product and closer quality control.

In addition to these very definite manufacturing advantages, other gains have been realized through the use of this condensate-return system. These include higher steam-producing capacity because of the higher temperature of the feedwater entering the boiler; more steady boiler operation, particularly as to maintenance of steady steam pressure and constant water level; and reduction in the amount of makeup water that must be added to the boiler.

Finally, there is a direct saving in fuel. While experience at the Ritter plant is not yet of sufficient duration to warrant the publication of any exact figures, a rough approximation of this saving was made by comparing the fuel consumption per batch produced in August, 1940, and August, 1941. Records of fuel consumption and of batches processed (corrected for variations in water content of the unprocessed batches) indicate that about 13 percent less fuel was used per batch in 1941 with the condensate-return system than in the previous year without the system.

These kettles at the P. J. Ritter Co. plant in Bridgeton, N. J., are served by the new high-temperature condensate-return system.

Birdseye Demonstrates New 20-Plate Froster

BY L. V. BURTON
Editor, "Food Industries."

High-capacity, continuous quick freezer automatically controls rate of feed to attain constant predetermined temperature of frozen product. Has conveyor feed and discharge and fits into production line.

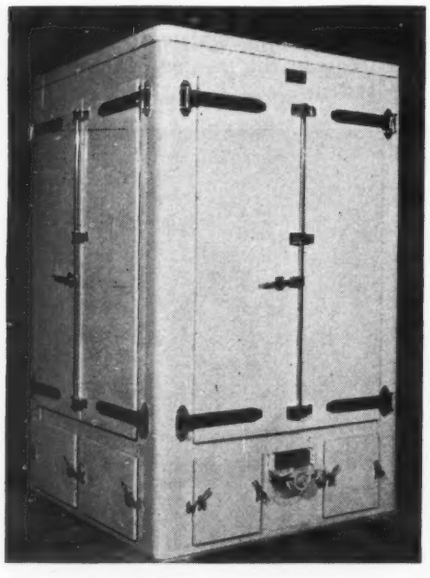
A FULLY commercial 20-plate "Gravity Froster" was demonstrated by Clarence Birdseye at Brockport, N. Y., on September 18. The latest machine has been under test at the plant of Brockport Ice and Cold Storage Co., where it has been operating on cut whole-grain corn for Curtice Bros. Co. of Rochester. This new 20-plate quick freezer represents an enlargement in capacity and improvement in control and efficiency of operation over the semi-commercial 10-plate unit described in FOOD INDUSTRIES, September, 1940, page 44.

Housed in a white-enameled, chromium-trimmed insulated case, the new machine does not reveal much of its workings until the doors have been opened. In general, the food to be frozen (in this case, cut corn) is fed into the top of the froster in a continuous stream through a vibratory feeding device which automatically regulates the rate of feed. The food drops onto the topmost of the 20 freezer plates, where knives and scrapers, rotating on arms extending from a central vertical shaft driven by a 4-hp. motor, move the material slowly along in a circumferential direction until the rear of the opening is reached. Falling down through this opening, the food strikes the second plate just ahead of its opening and is moved around the circle by knives and scrapers in the same manner until the opening is reached. Here it falls to the third plate, and the operation continues as just described, the food passing successively over all 20 of the freezing plates. Discharge from the bottom plate is into a spiral conveyor which delivers the food outside the machine.

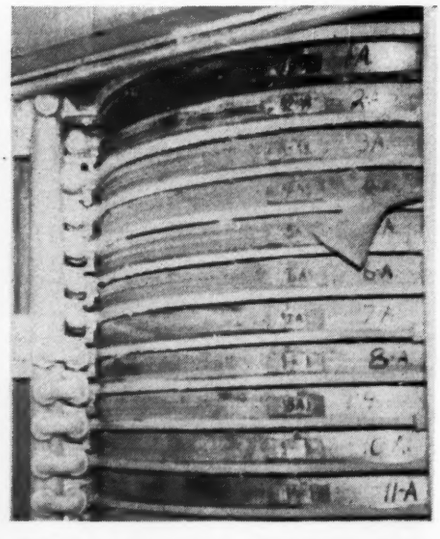
Each plate is hollow, being fabricated from 5-ft. disks of stainless steel, and is $^{17}/_{32}$ in. in total thickness. The plates are $3\frac{1}{2}$ in. apart on centers. The space between adjacent plates is about 3 in., and in each of these spaces are the arms that drive the scrapers and knives, the function of the latter being to cut loose from the plates any material which may have frozen fast. Under normal operating conditions, all (solid) dry food is sufficiently frozen by the time it has dropped to the sixth plate so that it has become a free-flowing solid in which only the interior portion of each particle (kernel of corn, pea or lima bean) remains to be frozen solid during the subsequent passage over the 14 remaining plates.

Frost which collects on the underside of the plates represents moisture evaporated from the food, and is scraped off by the same scrapers that actuate the forward movement of the food. This frost falls off and is mingled with the food particles and affords an important economy in absorbing heat from the food in all the stages of freezing. Each separate unit of the food mass, when it emerges from the freezer, is covered with a thin, tightly adherent layer of this frost, which adequately protects the product against freezer burn during storage. There is no loss of weight during freezing. An air-circulating fan maintains a constant recirculation of air within the insulated housing, a feature that furthers the rate of heat transfer from the food to the refrigerating system. This air is cooled by contact with the under sides of the plates.

Each refrigerating plate contains a series of radial and circumferential baffles to distribute the flow of liquid ammonia to all parts of the plate. The

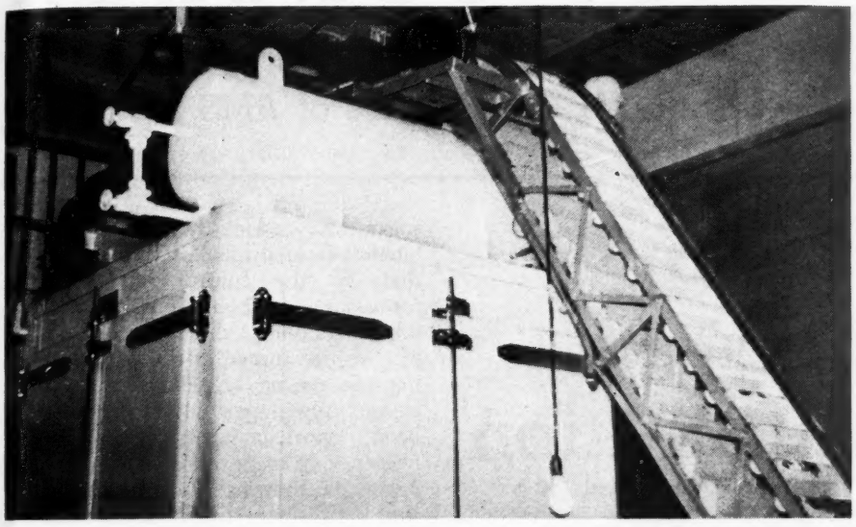


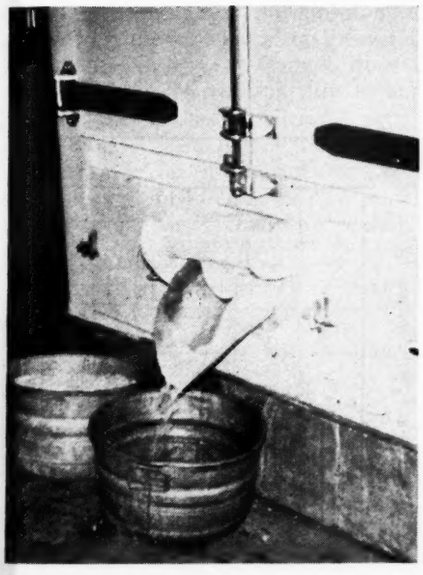
The 20-plate "Gravity Froster," with its insulated white-enameled housing. It occupies 36 sq. ft. of floor space and weighs about 6 tons empty.



With the doors open, the interior of the freezer can be observed. Note absence of frost on the top section only. There are 20 sections, the food entering at the top and passing from one section to another until it discharges at the bottom.

Refrigerating plate from freezer, standing on edge. Diameter is 5 ft.; center hole is for shaft which drives scraper and knife arms over plate; radial hole permits partially frozen food to drop through to next plate.





Right—Cut corn is dumped into feeder of gooseneck elevating conveyor. Above—Elevating conveyor discharges corn into vibratory feeding mechanism on top of freezer. Left—Corn, frozen solid, discharges from bottom of freezer in continuous stream. In a normal production line this would feed into a package filling machine.

TABLE I—Capacities of Froster with Different Products.

Product	Lb. per hour	Plate temp. (deg. F.)
Peas	1,500	—26
Lima beans	1,600	—26
String beans	1,200	—26
Blueberries	1,500	—26
Strawberries, sliced	1,800	— 5
Crushed fruits	2,500	— 5
Fruit juices	3,000	— 5
Shrimp, green tails	1,200	—26
Cream, 40 percent butterfat	3,200	+ 5
Egg yolks	3,000	+ 5

entire system is operated as a flooded ammonia system, with circulation of the ammonia maintained by a small centrifugal pump.

Automatic control of the temperature of freezing is maintained by a thermostat, the thermal element of which is located in the outlet chute so that the temperature of the outgoing frozen food, 0 deg. F. in the case of the corn undergoing test, actuates the thermostat. This in turn controls the rate of feeding the freezer. Thus, any fluctuations in temperature of the entire system are automatically compensated by a varying rate of feed. And the food can be delivered to the outlet chute at whatever predetermined temperature the operations may require.

Capacity of the machine will, of course, vary with a number of circumstances, of which several may be enumerated:

1. Moisture content of the food itself. Each pound of water frozen requires the removal of 144 B.t.u. (after temperature has been reduced to 32 deg. F.).

2. Temperature of the incoming food. In the test on cut corn the temperature was 60 deg. F.

3. Temperature of the food at the outlet, which in this test was 0 deg. F.

4. Temperature of the liquid ammonia.

5. Character of the contact of the food with the refrigerated plates.

Previous tests conducted on peas showed a capacity of 1,800 lb. of frozen peas per hour, whereas the previously computed capacity had been conservatively placed at 1,500 lb. for the 20-plate machine. At the time of writing, the corn data had not been sufficiently analyzed to present an exact figure based on an average 8-hour run, but it is estimated that the machine will freeze 1,500 lb. of cut corn per hour in continuous operation. Freezing time is approximately 40 minutes.

Data published by Mr. Birdseye (*Refrigerating Engineering*, November, 1940) give the calculated capacities, under standard conditions, listed in Table I.

Data in this table were derived by calculation from data obtained from tests of the semi-commercial 10-plate gravity froster described in the September, 1940, issue of FOOD INDUSTRIES. The capacity for freezing vegetables (which varies from 1,200 to 1,800 lb. per hour) is largely dependent on the shape of the vegetables, which, in turn, affects the area of contact with the refrigerating plates. Lima beans, with their relatively flat surfaces, afford a better contact for heat removal than spherical objects such as peas, or irregular objects such as string beans.

Although commercial tests on the freezing of fruits in sirup have not yet been conducted, this machine can freeze them successfully. In experimental runs, it is found that the fruit itself freezes solid, but the sirup remains liquid and can be drained off and recirculated to freeze additional food, or any desired part of the sirup may be added to the fruit as it is put into the package.

A freezing operation of this sort is, of course, adopted for large-volume operations in which the food is frozen in bulk prior to packaging.

Gravity Froster Corp., the company which handles the commercial exploitation of this development, plans to lease the machines to food companies on the basis of a fixed annual rental without any unit royalty fee.

QUALITY CONTROL

Effect of Adding Sugar to Brines in Pickle Fermentation • Summaries of AMS Standards

Influence of Sugar Addition to Brines In Pickle Fermentation

By M. K. VELDHUIS and J. L. ETCHELLS

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PART II—This paper*†‡ summarizes a series of tests that show that the addition of sugar to brines in the manufacture of salt stock or dill pickles not only fails to increase the acidity of the brines to a useful degree, but also leads to an increase in the proportion of bloaters in the stock.

A GENERAL reconsideration of the individual experiments which have been conducted indicates that the data has consistently shown that there was no appreciable increase in acid formation induced by the addition of sugar to brine prior to or during the period of active fermentation. Small differences between treatments in comparative brine acidity have been shown from one experiment to another. The results of the experiments involved are collected in table form (Table I). These results have been analyzed to determine if the small differences observed between treatments were significant. This analysis indicated that greater variation was encountered between treatments than between duplicate lots within a treatment. However, the observed differences between treatments was too small to be considered significant (tested by analysis of variance).

To further clarify this matter, the acidity values for four different experiments have been averaged for respective treatments and presented graphically (Fig. 8). Each curve represents an average of values from eight barrels for each treatment. Two conclusions are drawn from the curves shown in Fig. 8: (1) The difference in brine acidity between the lots receiving added sugar and those to which no sugar was added was never greater than 0.06 percent; (2) there was no evidence indicating that acid formation was accelerated by the addition of sugar at the start of the experiment. From the evidence presented in Table I and Fig. 8, the authors conclude that the addition of sugar to dill brines during the curing process did not result in significant change in brine acidity.

In connection with these experiments involving the addition of sugar to salt stock and dill brines, observations upon changes other than in brine acidity have been made.

At the end of the 1938 season it was found that in the lots of dills to which sugar was added the proportion of bloaters formed was many times greater than in the control lots. Bloater formation is particularly undesirable in dill production. A discussion of the subject of the formation of bloaters during the curing of salt stock or dills is not properly included here but has been reported separately. However, reference is made at this time to certain data showing a distinct relationship between the percentage of bloaters formed and the addition of sugar to the brine during the curing process. Table II gives data obtained during two seasons in connection with the manufacture of dill pickles. The results show

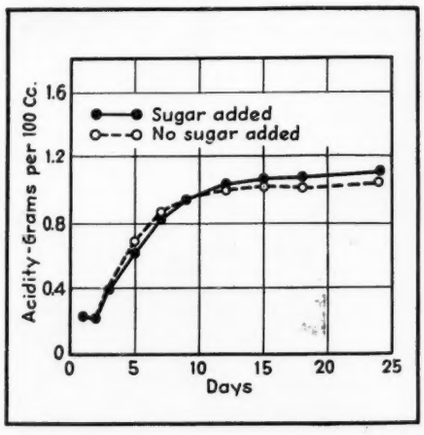


Fig. 8. Influence of the addition of sugar (3.5 lb. of dextrose at start) to dill brines. Graph represents comparative averages of values from four experiments conducted in three seasons.

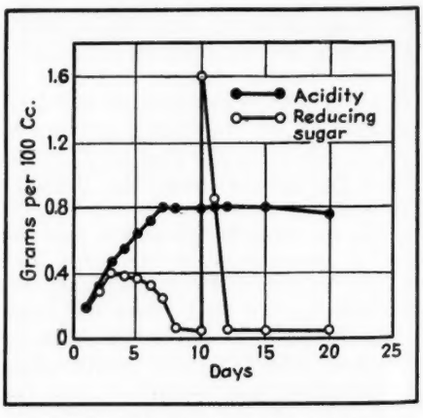


Fig. 9. 1939 salt stock, vat study, showing influence of addition of sugar to 20-deg. brine on tenth day. Salting schedule: 20 deg. first week, raised 10 deg. per week thereafter.

* N. C. Agricultural Experiment Station Technical Paper No. 116. Food Research Unit Contribution No. 2.

† This paper was read before the Technical School of Pickle and Kraut Packers at Michigan State College, February 20-22, 1940.

‡ The first part of this article appeared in *Food Industries*, October, 1941.

that a marked increase in the percentage of bloaters formed occurred when sugar was added to the brine and points strongly to the undesirability of such additions.

Bloater counts were also made in connection with the salt stock experiment involved in Fig. 2. Special precautions were taken to insure uniformity of stock before the dextrose was added on the 11th day. The results of the counts given in Table III show more than a three-fold increase in bloaters in barrels to which sugar was added.

Particular importance is attributed to the results of this experiment because of the precautions taken to keep all factors constant except the quantity of sugar added. It demonstrates not only the ineffectiveness of the practice of adding sugar to the brine to increase brine acidity (see Fig. 2), but also the decided undesirability of the practice from the viewpoint of the quality of the salt stock produced.

So far the studies which have been reported have been confined to those of the production of salt stock or dills cured in small lots; that is, three or four bushels of cucumbers cured in barrels. A single experiment involving the use of a vat of cucumbers has been conducted and the observations were very striking. This experiment is outlined as follows:

An 85-bu. vat, salted according to a 20-deg. schedule, was inoculated during the first 24 hours with 20 gal. of a brine which was undergoing a rapid acid fermentation. This vat in turn exhibited an active acid fermentation during the first week of the curing process. On the tenth day, 85 lb. of dextrose was added to the brine. The brine was then mixed by pumping-over for an hour. Observations made include change in brine sugar concentration, brine acidity changes, comparative rate of gas evolution and changes in the microbiological flora induced by this treatment. Fig. 9 presents the observed changes in brine acidity and brine sugar concentration during the first 25 days of the curing of this vat. It is evident that the addition of sugar to this lot of fermenting salt stock was of no significance whatever, in respect to acid formation. The disappearance of sugar was exceedingly rapid. To further indicate the rate of sugar decomposition, Table IV has been prepared.

Gas evolution took place so rapidly that several gallons of brine overflowed the vat, because of volume changes induced by gas formation. This extremely rapid gas production and rapid sugar destruction indicated intense microbiological activity. Bacteriological analyses of the brine of this vat were made at daily intervals during the period of active fermentation. Microbial population relationships are shown in Fig. 10. The curve in the upper part of this figure shows that the acid-forming bacteria count was high during the first week, the peak being reached on the fifth day. Subsequent to this time, a rapid decline in numbers occurred in spite of the addition of sugar to the brine on the tenth day. This fermentation is shown to have been more or less complete on the twelfth day.

The yeast population on the other hand (lower part of curve) presents an entirely different picture. The yeast count increased rapidly after the fifth day, attained an apparent maximum on the seventh day and then started to decrease. Upon addition of sugar on the tenth day, the yeast count jumped to the exceedingly high figure of 810,000 per cubic centimeter on the eleventh day and dropped rapidly to a very low figure on the thirteenth day.

It will be recalled that, in Table IV, chemical analysis of the brine indicated that the brine sugar concentration on the twelfth day had already diminished to a very low equilibrium level.

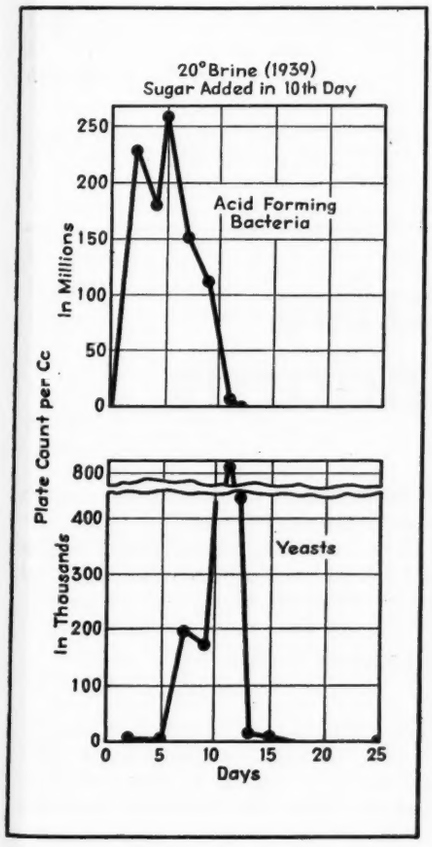


Fig. 10. 1939 salt stock, vat study, showing influence of addition of sugar to 20-deg. brine on tenth day upon the growth of acid-forming bacteria and yeasts.

TABLE I—Influence of Addition of Sugar to Dill Brines During Fermentation.

(Brine acidity, on 18th day, of individual lots receiving treatments listed below. Acidity expressed as grams lactic acid per 100 ml. brine.)

	Treatment			
		Sugar added		
Year	No sugar added (control)	At start	On 7th or 10th day	At 2-day intervals
1937	1.08	1.16	.....	.....
	1.12	1.13	.....	.....
Mean	1.100	1.145	.....	.....
1938	1.01	1.20	1.08	.....
	1.21	1.24	1.10	.....
Mean	1.110	1.220	1.090	.....
1939	0.98	1.12	1.07	0.97
	1.03	1.00	1.04	1.11
Mean	1.005	1.06	1.055	1.040

TABLE II — Bloaters Formed During Production of Dills.*

[In lots which received sugar at different times during the fermentation and in lots which received no additional sugar (control).]

	Percentage of bloaters			
	2,400 count size (1939 studies)		800–1,000 count size (1938 studies)	
Time of addition of sugar to brine	Sugar added lot	Control	Sugar added lot	Control
At start.....	18	4	78	20
On 7th day.....	..	..	70	20
On 10th day....	26	4	..	..
** At intervals..	17	4	..	..

* Salting schedules: All lots received standard treatment involving addition of dill weed, mixed spices, 0.5 gal. 110 grain vinegar, and salt at rate of 0.45 lb. per gallon capacity of barrel at start. Barrels were headed, filled with water and rolled at frequent intervals early.

Sugar-added lots received 3.5 lb. dextrose at times indicated.

** 0.7 lb. dextrose added at start and subsequently on 4th, 6th, 8th and 10th days.

TABLE III — Bloaters Formed During Production of Salt Stock.*

[In a lot which received 3.5 lb. of dextrose on eleventh day and a lot which received no additional sugar (control).]

Treatment	Percentage of bloaters
Sugar-added lot.....	91
Control (no added sugar).....	28

* Cured according to 40 deg. salting schedule.

TABLE IV—Changes in Titratable Acidity and Sugar Concentration of Brines.

(Immediately preceding and following the addition of 85 lb. of dextrose to an 85-bu. vat of salt stock on tenth day.)

Starting (days)	Titratable acidity (Expressed as gm. lactic per 100 ml.)	Sugar concentration (Expressed as gm. glucose per 100 ml.)
8.....	0.79	0.06
10 (prior to addition of sugar).....	0.79	0.04
10 (after addition of sugar calculated...	....	1.6 or greater
11 (11:00 a.m.).....	0.80	0.85
11 (4:00 p.m.).....	0.80	0.53
11 (11:00 p.m.).....	0.81	0.12
12.....	0.80	0.05
15.....	0.80	0.05

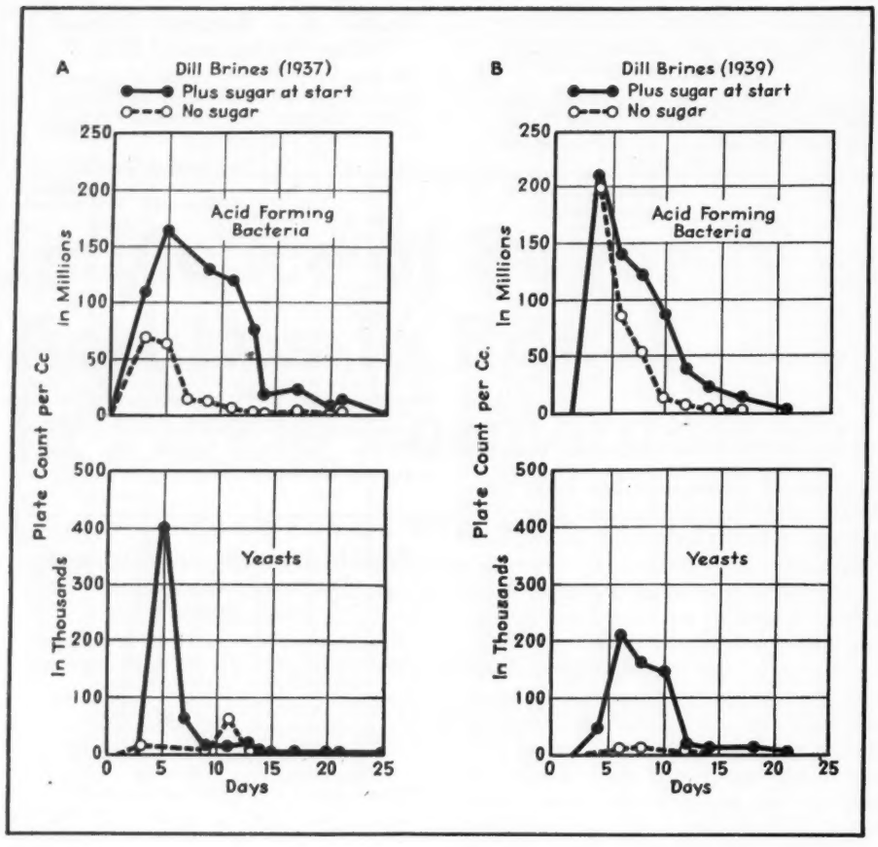


Fig. 11. Dill studies, showing influence of addition of sugar at the start upon growth of acid-forming bacteria and yeasts.

Additional data on differences in microbial population induced by the addition of sugar to brines is shown in Fig. 11. These represent observations on some of the dill experiments previously described in this report.

Part A of Fig. 11 represents the 1937 studies. The acid forming bacteria curve (upper part) indicate that there was a marked increase in the number of these organisms in the case where sugar was added to the brine as compared with the no sugar treatment. The lower curves of part A show the yeast population in the same brines. As was true for acid-forming bacteria, the yeast counts attained a much higher level and were higher over a considerably longer period in the treatment receiving added sugar than in the control lot.

In part B of Fig. 11 (1939 studies), a general relationship very similar to that shown in part A is seen. In this latter case, however, the difference in the population of acid-forming bacteria was not as great between treatments as in the 1937 studies. However, the lower curves of part B indicate that the yeast population was markedly different between the treatment receiving added sugar and the control.

It would therefore seem, from the limited bacteriological observations presented here, that the addition of sugar to brines at the start of the curing of salt stock or dills results in a condition favoring the development of increased microbial populations. The quantitative relationships in this respect may vary considerably from one time to another. This increase in the number of organisms may appear in some cases to be that of the acid-forming bacteria, in other cases that of the yeasts, and in still other cases there may be greater numbers of both types of organisms. The observed increase in acid-forming bacteria which developed when sugar was added to brines before or during the fermentation has not been reflected in a significant increase in brine acidity.

Summary and Conclusions

Under the conditions described, observations have been reported on the addition of sugar to brines before fermentation begins, or during fermentation, in the production of dills and salt stock. This report deals with studies conducted during four curing seasons, involving several salting treatments.

The addition of sugar to salt stock or dill brines, prior to or during active fermentation, caused no significant change in brine acidity as compared to control treatments. Furthermore, there was no evidence of an acceleration of acid formation when sugar was added at the start or after the fermentation was in progress.

The addition of sugar brought about a large increase in the proportion of bloaters formed during the production of either salt stock or dills.

For references see Part I, Food Industries, October, page 54.

Brief Summaries Of AMS Standards

For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Service.

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Service of the U. S. Department of Agriculture are prepared by Food Industries. Those that follow and those appearing in the August, September and October issues continue the series started last year.

The complete text of the standards can be obtained from the AMS, located in Washington, D. C.

Canned Peas

(Final)

The standards of identity, fill of container, and quality for canned peas, promulgated by the Secretary of Agriculture under Sec. 401 and Sec. 701 of the Federal Food, Drug and Cosmetic Act of June 25, 1938, by orders issued Feb. 23, 1940, and any revisions or amendments thereof, or other standards hereafter promulgated pur-

suant to the Federal Food, Drug and Cosmetic Act, are hereby adopted for the purpose of these grades.

Canned peas are of two types: Early peas (early maturing or other smooth skin varieties), and sweet peas or sugar peas (later maturing, wrinkled varieties which have a natural sweet flavor).

U. S. GRADE A or U. S. FANCY canned peas or peas surrounded by practically clear liquor; possess a practically uniform typical color; are practically free from broken peas and other defects; are very tender, possess a normal flavor; and score not less than 90 points when scored according to the scoring system outlined herein.

U. S. GRADE B or U. S. EXTRA STANDARD canned peas are peas surrounded by reasonably clear liquor; possess a reasonably uniform typical color; are reasonably free from defects; are reasonably tender; possess a normal flavor; and score not less than 75 points.

U. S. GRADE C or U. S. STANDARD canned peas are peas surrounded by liquor which may be cloudy; possess a typical color which may be variable; are fairly free from defects; may be starchy; possess a normal flavor; and score not less than 60 points.

OFF-GRADE canned peas are peas which fail to meet the requirements of U. S. GRADE C or U. S. STANDARD. Canned peas which fall below the Standard of Quality promulgated under the Federal Food, Drug and Cosmetic Act shall be certified with the additional statement, "Below Standard in Quality," together with the reason for so certifying.

As used in these grades: "Normal flavor" means that the product is free from objectionable or off-flavors of all kinds.

Canned peas shall be considered standard in fill if the container is so filled that, when the peas and liquid are removed from the container and returned thereto, the leveled peas (irrespective of the quantity of the liquid), 15 seconds after they are so returned, completely fill the container. A container with lid attached by double seam shall be considered to be completely filled when it is filled to the level 3/16 in. vertical distance below the top of the double seam; and a glass container shall be considered to be completely filled when it is filled to the level $\frac{1}{2}$ in. vertical distance below the top of the container. Canned peas which do not meet the fill of container requirement for canned peas shall be certified "Below Standard in Fill."

Certificates of grade covering canned peas shall indicate the size or combination of sizes found upon examination. The various sizes of canned peas are as follows: No. 1 size peas are peas that will pass through a screen of 9/32-in. mesh; No. 2 size peas are peas that will pass through a screen of 10/32-in. mesh, but not through a screen of 9/32-in. mesh; No. 3 size through 12/32 but not through 10/32-in.; No. 4 through 12/32 but not through 11/32; No. 5 through 13/32 but not through 12/32; No. 6 through 14/32 but not through 13/32; and No. 7 size peas are peas that fail to pass through a screen of 14/32-in. mesh.

The grade of canned peas may be ascertained by considering, in addition to the foregoing requirements, the following factors: Clearness of liquor (20 points), uniformity of color (15 points) absence of defects (25 points) and maturity (40 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The factor of absence of defects deals with the degree of care exercised in the removal of harmless extraneous vegetable material (such as pea pods and thistle buds), broken peas, and spotted or otherwise discolored peas. The pea seed is considered unbroken if the two cotyledons are held together by the skin, even though the cotyledons may be cracked or partly crushed or the skin split.

The maturity factor is determined by a flotation test.

ISSUED: May 1, 1941.
EFFECTIVE: May 1, 1941.

Canned Beets*

The standard of identity for canned beets promulgated under Sec. 401 of the Federal Food, Drug and Cosmetic Act of June 25, 1938, is hereby adopted for the purpose of these grades.

WHOLE beets are beets which retain their original conformation after peeling and trimming. SLICED beets are beets which are cut into slices not thicker than $\frac{3}{8}$ in. QUARTERED beets are beets which are cut longitudinally into four approximately equal units. DICED beets are beets which have been cut into cubes not larger than $\frac{1}{2}$ in. SHOESTRING beets are beets which are cut into strips of varying length with not to exceed $\frac{3}{16}$-in. cross-section. CUT beets are beets which are cut into pieces weighing not less than $\frac{1}{4}$ oz. and not conforming to any of the above-named styles. "Orange cut" beets are included in this style.

U. S. GRADE A or U. S. FANCY canned beets possess a good, practically uniform color; are practically uniform in size and symmetry; are practically free from defects; are tender; are free from objectionable or off flavors; and score not less than 85 points when scored according to the scoring system outlined herein.

U. S. GRADE C or U. S. STANDARD canned beets possess a fairly good, fairly uniform color; are fairly uniform in size and symmetry; are fairly free from defects; are fairly tender; are free from objectionable or off flavors; and score not less than 70 points.

OFF-GRADE canned beets are beets which fail to meet the requirements of U. S. GRADE C or U. S. STANDARD.

The container shall be filled with beets as full as practicable without impairment of quality. The product and packing medium shall occupy not less than 90 percent of the total volume capacity of the container. The minimum drained weights in the cans commonly used in packing canned beets are shown in a table in the standards.

Size designations for canned whole beets are shown in another table in the standards. Official certificates of grade will indicate the size designation and count found upon examination. If it is apparent that whole beets have not been graded for size, certificates of grade will designate the product as "Ungraded for size."

The grade of canned beets may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (20 points), uniformity of size (20 points), absence of defects (25 points) and texture (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

As used in these grades, the term "uniformity of size" has different meanings with respect to the various styles of canned beets.

The factor of absence of defects has reference to the degree of freedom from "slabs" (or first cuts) and units damaged by blotch, stain, black internal discoloration, scab, poor peeling or trimming and insect or mechanical injury. Mechanical injury has reference to such defects as broken slices and deep knife marks.

ISSUED: September 9, 1941.
EFFECTIVE: October 1, 1941.

* This supersedes the tentative standard, an abstract of which was published in the December, 1940, issue of *"Food Industries,"* page 59.

MATERIALS

Easing Shipping Carton Situation • Survey Reveals Facts on Lard • Shorts on Shortages

Relieving the Shortage In Shipping Containers

In view of the emergency-born shipping container shortage, the practical suggestions set forth in this article may be valuable to those plants that use a large volume of such containers

THE carton or shipping case shortage, where it exists, is not a matter of rising prices in a rising market, but is an actual dearth. The cartons needed do not exist. The needs of national defense for shell cases and other items and a shortage of paper are behind this problem.

The carton-making industry is rapidly increasing its capacity, and should be able to keep its regular markets well supplied within a short time. So the whole problem is a temporary one. But how temporary? Who knows how much of what the national defense will need, and over how long a time period?

Users of shipping cartons have become accustomed to package engineering to the nth degree. In the late lamented heavily competitive market, the sales engineers of the carton-making companies ironed out every little wrinkle in the trouble or cost involved in using cartons. Some of the shortage can be relieved by forgetting some of those little niceties.

One carton maker says that the shortage in the district which he serves, is only in the solid fiber cartons. He still has plenty of capacity for the corrugated types. Users of solid fiber, unless using the cartons mainly for export, can switch. Other users can solve problems by changing to standard sizes and types of cartons. Specialties are out.

Think a Few Steps Further

Shipping managers have been accustomed to thinking clear through to the retail outlets in which their cartons are to be emptied. But that thinking has assumed that the cartons either would be destroyed at the point of use or would be sold to junk dealers.

If new cartons cannot be had, the obvious recourse is to reuse the old ones. And already many cartons have the printed admonition in large letters on their sides: "Do Not Destroy This Carton. Return It."

To get cartons returned, it is necessary to think through the steps to be taken in getting them back. Those steps are: (1) Opening at the retail outlet in such manner that the cartons receive the least damage. (2) Reimbursing the retailer for his trouble in opening gently and saving the cartons. (3) Collecting the cartons. (4) Refilling them.

The problem of opening the cartons may start at the sealing machines. In the past the destruction of cartons as they were unpacked has been of no consequence, and the economy of a sealing method has been a matter of the firmness with which the seal will hold and the cost of sealing. Now perhaps the sealing should be such as to permit the carton to be opened without tearing the flaps. Salesmen and merchandising men may have to instruct the retailers on how to open cartons.

In reimbursing the retailers the local junk collectors must be outbidden. The bonfire which used to be built in the backyard of the grocery store once a week is becoming smaller and rarer.

As this is being written, the prices paid for used kraft cartons are about $27 per ton, for jute about $16.50 per ton and for mixed about $18. These are in eastern markets. Of course, the per-ton price would have to be reducd to a per-carton figure in dealing with retailers.

It would be possible to buy back only the cartons which have been opened with adequate care, letting the others be sold by the retailer to the junk collector at lower prices. Or the buying of all cartons would provide scrap which might have bargaining value in dealing with carton makers.

Once the cartons had been returned to the packaging plant, it might be necessary to set up a special sealing line for them. All-purpose sealing equipment would do better here than specialized units. And after all, it is not expected that the re-used cartons will ever have to do more than eke out or compensate the diminished supplies of new ones.

How to get enough shipping containers to carry products from the factories to the distribution outlets is a problem facing food manufacturers. This article suggests some solutions.

A special sealing line will prevent the re-used cartons with their extra problems from slowing down the main lines.

More Cooperation

It will help greatly if carton users will get behind every movement to cause more waste paper and similar materials to flow into the regular channels of scrap and junk collecting and selling. These campaigns will help to keep supplies up and prices down.

Carton clearing houses, in which used cartons of all sorts are collected and exchanged, may be advisable for some districts. Cartons are easy to relabel. The function of a clearing house would be to get cartons from local retailers, farmers and junk collectors, route the usable ones to the local factories which can best use them and sell the rest as scrap.

The more remote a district is from the larger industrial areas, the more likely this clearing-house idea is to work. In many of the most remote districts, scrap collecting has not yet hit its stride. Those districts are habituated to the thought that freight rates will eat up the values of any paper scrap they may collect. Therefore, in those districts large supplies of re-usable cartons may be going to waste.

Facts About Lard Revealed by Survey

Variations in production and distribution, types of containers used, kinds of lard produced and AMS and industry definitions given. Data were gathered as preliminary to formulation of standards

LARD prices have declined to very low levels in recent years, giving bakers who use that material a break but creating a problem for meat packers and hog producers. This situation is the result of increasing competition from vegetable oils and other fats and from the loss of a large part of the export market.

It has been suggested that the demand for lard could be increased if grade standards for it were established, and as a step in that direction a survey of lard production, packaging and distribution has been made by the Agricultural Marketing Service in cooperation with American Meat Institute. The information presented in the report on this survey by Meade T. Foster, AMS Associate Marketing Specialist, is of value not only to the meat packer but to the baker who uses lard and to the vegetable-oil manufacturers who compete with it.

Thirty-nine large lard renderers contributed data in this survey. Two-thirds of the Federally inspected lard, or about 40 percent of the total lard produced, was rendered by these companies during the period covered by the survey—November, 1938, to October, 1939.

Variation in Production

The yield of lard per hog fluctuates widely. Under average conditions lard and rendered pork fat constitute 12 to 15 percent of the live weight of slaughtered hogs. However, the quantity of lard produced per hog increases when corn is plentiful and when the hog-corn price ratio is favorable. Other factors also influence the quantity of lard produced by packers. For example, two of the primary wholesale cuts from the hog carcass may be cured and sold as such or may be rendered into lard. When prices of these wholesale cuts are high it is a general practice among packers to cure as large quantities as the trade will absorb. Thus the demand for pork affects to some extent the quantity of fat converted into lard. For these reasons the yield of lard during the last ten years has varied from a high of 35.7 lb. per hog in 1933 to a low of 25.0 lb. in 1937.

Lard production is greatest in November, December and January and reflects heavy marketing of hogs from the spring pig crop during these months. In May and June the production of lard again increases since hogs from the fall pig crop are normally marketed at that time.

Promptness in rendering fat after slaughter is an important factor in determining the ultimate quality of lard. If the fat is rendered without undue delay, lard of low free fatty acid content is produced. Such lard has a relatively high smoke point. A large percentage of the packers whose production was included in this study rendered their killing fats the same day they were produced, their leaf fat within 24 hours and their cutting fat within 12 to 48 hours after the hogs had been slaughtered.

Lard distribution shows less seasonal variation than production and tends to vary conversely with production. Lard that has been properly processed and stored can be held in storage for a considerable time without showing appreciable depreciation in quality. Storage stocks of lard increase from the first of the year to about the first of August, then decrease rather sharply during the remainder of the year, to make room for the new season's crop.

Containers

Although the butter-type carton with the paper liner is now the one most extensively used for packaging lard intended for retail distribution, it is not completely satisfactory from the customer's standpoint. In filling the carton, lard too frequently comes into contact with the outside of the liner. The re-

TABLE I—Kinds of Lard Produced by 39 Packers

(November 1, 1938, to October 31, 1939)

Kind of lard	*Production* 1,000 lb.	Percent
Steam-rendered	702,885	84.4
Kettle-rendered	78,225	9.4
Dry-process-rendered	48,305	5.8
Neutral	3,396	0.4
	832,811	100.0

TABLE II—Distribution of Lard by 39 Packers Through Various Outlets

(November 1, 1938, to October 31, 1939)

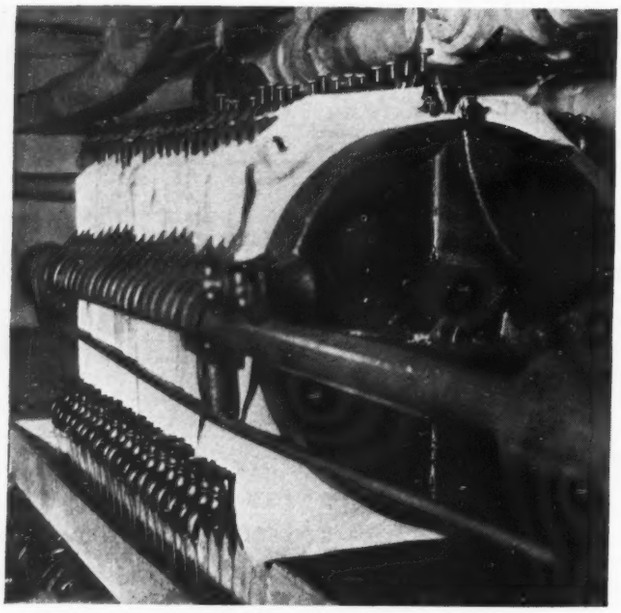
	1,000 lb.	Percent
Distribution trade [1]	411,241	59.6
Bakeries	175,521	21.6
Export	172,429	21.2
Refineries	29,739	3.7
Board of trade [2]	14,988	1.8
Plant manufacturing	1,356	0.2
Other users	5,700	0.7
In storage	1,696	0.2
Total	812,670	100.0

[1] Includes chain and independent distributors, wholesalers, jobbers, institutions, etc.
[2] Includes only the quantity actually delivered.

TABLE III—Kinds of Lard Consumed in Bakeries

(Based on shipments of 39 lard packers, November 1, 1938, to October 31, 1939. The 175 million pounds of lard represent slightly over 21 percent of all kinds of lard reported produced in this survey.)

Kind of lard	*Consumption* 1,000,000 lb.	Percent
Steam-rendered	139.2	79.3
Kettle-rendered	27.2	15.5
Dry-process-rendered	7.6	4.3
Neutral	1.5	0.9
Total	175.5	100.0



One of the steps in refining lard, filtering after pressing.

sult is lard oil penetration to the outside of the carton and a greasy surface.

Many other containers were also used for packaging lard for the distribution trade. The proportion of lard packaged in 50 lb. cans and 60–80 lb. tubs approached that packaged in cartons. Packers continue to use small pails to some extent, but the cost of these is considerably higher than for cartons. Recently there has been a slight increase in the use of tin cans with a removable top emphasizing the re-use feature of the can.

In packaging lard for the bakery trade extensive use is made of the larger containers such as drums and tierces. Some use is made of large cans and tubs, but the proportion of the total packaged in these containers is relatively small. A small quantity of lard is shipped to bakeries in tank cars.

For the export trade the most popular and extensively used containers were tierces, square tins and boxes. Extensive recent use of the pound carton is also reported.

The distribution of lard to the various users as reported in this survey was as follows: About half the lard was absorbed by wholesalers, jobbers, institutions, chain and independent distributors, etc. The bakeries absorbed slightly over one-fifth and a similar amount was exported. Other miscellaneous uses accounted for the balance. These figures are representative of packer sales of lard and although indicative do not necessarily represent the exact proportions taken by the different groups of users.

Definitions and Types

In the absence of a generally recognized standard of quality for lard, recent action towards that end is of interest.

The Bureau of Animal Industry last year established a standard of identity that defines "lard" and "rendered pork fat" as follows:

LARD: The fat rendered from fresh, clean, sound, fatty tissues from hogs in good health at the time of slaughter, with or without lard stearin or hardened lard. The tissues do not include bones, detached skin, head fat, ears, tails, organs, windpipes, large blood vessels, scrap fat, skimmings, settlings, pressings and the like, and are reasonably free from muscle tissue and blood.

RENDERED PORK FAT: The fat, other than lard, rendered from clean, sound carcasses, parts of carcasses, or edible organs from hogs in good health at the time of slaughter, except that stomachs, tails, bones from the head and bones from cured or cooked pork are not included. The tissues rendered are usually fresh, but may be cured, cooked or otherwise prepared and may contain some meat food products. Rendered pork fat may be hardened by the use of lard stearin and/or hardened lard and/or rendered pork fat stearin and/or hardened rendered pork fat.

A year ago the meat industry adopted the following pure-lard standards formulated by American Meat Institute:

1. Definition — Institute Standard Pure Lard shall be rendered from sound pork fat, handled in a clean and rapid manner. It shall, when it leaves the manufacturer's possession, meet the following specifications and conditions:

2. MOISTURE—The moisture shall not exceed two-tenths of 1 percent.

3. SUSPENDED MATTER — The lard shall be free from appreciable amounts of suspended matter, *i.e.*, when melted it shall appear practically clear as viewed in a standard color tube.

4. TASTE AND ODOR—The taste and odor shall be mild, sweet, and normal for pure lard.

5. COLOR—The color shall be that of pure lard correctly processed.

6. FREE FAT ACIDS—The F.F.A. shall not exceed five-tenths of 1 percent.

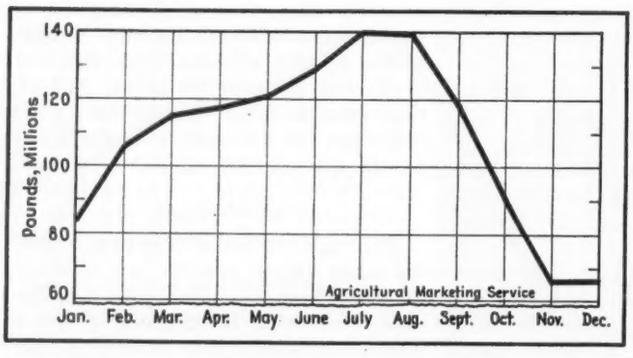
7. STABILITY—The stability shall not be less than 3 hours as determined by the peroxide method.

The four methods of rendering used commercially produce distinctive types of lard, as follows:

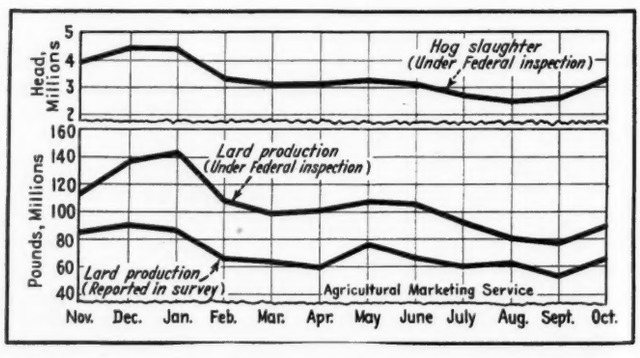
KETTLE-RENDERED lard represents the oldest known method of rendering. This method consists in the application of heat either direct or through a steam jacket to an open kettle. The fat is extracted from the tissue, the moisture is driven off in the process, and a lard of distinctive flavor and aroma results.

STEAM-RENDERED lard is made by render-

(Turn to page 96)



Storage holdings of lard, 10-year average, 1930-39. This chart and that at the right were prepared by Agricultural Marketing Service of the U. S. Department of Agriculture.



Hog slaughter and production of lard under Federal inspection, 10-year average 1929-39, and production of lard reported in lard survey, 1938-39.

Shorts on Shortages

You are not alone in your troubles growing out of the defense program, as the items on this page will testify. And you will find it interesting to see what others are up against. Perhaps you also will get some ideas that will stand you in good stead.

WITH problems of procurement and discovery of possible substitutes growing more difficult every day, FOOD INDUSTRIES is reporting from time to time on shortages that exist or may be anticipated. The first installment appeared in September. The third follows.

You are invited to contribute your own ideas or experiences to this department. Simply mail them to the editor.

Help Scarcity Hits Industry

ADEQUATE numbers of employees that are industrious, intelligent and stable are increasingly difficult to obtain. Manufacturers in all branches of the food industry are outspoken in their complaints about the quality, age, experience and attitudes of new employees, in particular complaining about the rapid turnover.

A recent survey of the most important problems of our industry brings forth such revealing phrases as:

"Mounting load carried by supervisors and technical men."—New Jersey.

"Labor turnover (unskilled class)."—Brooklyn.

"No labor troubles so far. Of course, inexperienced help has to learn."—New Jersey.

"Insufficient help. Need more older and experienced hands, people who will stick to job."—New Jersey.

"Increasing demands of labor."—Illinois.

"Lack of good help."—Wisconsin.

"Rapid turnover of male employees. Replacement of experienced men, who have gone to defense plants, unsatisfactory. A lot of youngsters and WPA graduates who have never learned to work."—New York State.

"No good reliable extra help available for peak loads."—Indiana.

"Young, inexperienced and careless help. Good ones drifting."—North Carolina.

"Shortage of good men. Many have gone into government work. Transients do not stick."—Vermont.

"Rising labor costs."—Chicago.

"Lack of intelligent applicants for employment, therefore placing more responsibility on those in supervisory positions. And owing to lack of intelligence more time must be spent in teaching new employees, which costs must be absorbed by production."—Pennsylvania.

"Getting experienced help."—Illinois.

"Inability to secure skilled labor, and discontent amongst our help."—Kentucky.

"Experienced help. Help leaving for shipyards."—Maine.

"Union activities."—Iowa.

"Finding experienced help. Labor troubles."—Michigan.

"Attitude of labor toward employer. Labor believes we are indeed industrial royalists."—Texas.

"Inability to obtain a good grade of common labor."—Illinois.

"Loss of trained workers (male) to government building projects in the vicinity."—North Carolina.

"Turnover of route salesmen to factory jobs."—Wisconsin.

"Good mechanics."—Florida.

"Turnover of production help."—Pennsylvania.

"Efficient and experienced help."—Missouri.

"Securing help, particularly male, that will stay more than a day or two, and have the desire to do a good job."—Pennsylvania.

"Inexperienced help."—California.

"Labor turnover."—Indiana.

"Young help."—California.

"Shortage of labor, and the labor acquired of such low morale they don't care if they work or not—too dependent on government."—Maryland.

"We have a union here. Many parts of country do not. Therefore wage scale here is much higher and we must therefore compete with low wage scale factories."—California.

"Insufficient labor supply, especially men. Large percentage of new, inexperienced help going with an ever-increasing rate of labor turnover during the operating season."—California.

"Inexperienced labor and shortage of same."—Maryland.

As we summarize the problem, it is a repetition of 1916, 1917 and 1918. Two methods of meeting it suggest themselves: (1) Training course for new employees; (2) additional supervisory help. Both will cost money, but so do current conditions. Employment of additional supervisory and technical help appears to be the more likely procedure, for it will result in quicker training of new employees.

Re-use of Drums

SERIOUS shortage of steel drums and other containers is general. As one aid in offsetting the shortage, the Internal Revenue Bureau is permitting re-use of alcohol drums, but only by the firm originally filling these containers and only for completely denatured alcohol or antifreeze based on that commodity.

Food manufacturers which can arrange for the re-use of drums and other containers are being urged to do this, as extreme economy in metal for containers is going to be required from now on. Where industrial users of foods can take large containers which could be made returnable, instead of single-trip smaller containers, it is suggested that changes be made in this direction promptly. Thus far the efforts of OPM to give priority on metal for making new drums for containers is limited largely to manufacture for special chemicals for which defense need is urgent.

England Delivers

EVIDENTLY England is still delivering the goods. New confectionery equipment of British manufacture has recently been shipped to the United States to manufacturers of confectionery who have been unable to obtain domestic-made equipment.

Wooden Boxes Again?

IN VIEW of the difficulty of obtaining corrugated and solid fiber containers, some food manufacturers in the Middlewest are considering going back to wooden cases or to the old wire-bound veneer box.

Aluminum Peak Ahead

ALUMINUM demand will probably reach its peak when the several gigantic new airplane factories are ready to start production. Take that new Ford plant at Ypsilanti, Mich., that is not scheduled to start work until December. The quantity of aluminum needed to stock it up and give every one of its 80,000 employees something to work on will be an amount many times larger than the weight of airplanes emerging from the assembly line for some time.

How To Keep Workers Interested in Safety

By ANDREW M. SMITH*

Personnel Safety Director, Godchaux Sugars, Inc., Reserve, La.

Statistics show that lack of active interest in safety on the part of workers is responsible for many accidents in food plants. So here is a job management ought to do. And it starts with the safety men themselves. This article gives some practical how-to-do-it's

WHEN we boil down safety in the sugar industry we find the same problems in our industry that are faced in the production of pickles, salt and crackers or what have you. A few peculiar conditions exist in every industry but other conditions are common to all industry.

Methods that save labor always cut down the hazard possibilities. This is illustrated by my first experience in a beet sugar plant some 23 years ago which first brought that principle to my attention. I was taken on as a seasonal employee to stamp pulp into the diffusion batteries. We worked 84 hours per week and, when the shifts changed from day to night and vice versa, we worked an 18-hour turn. There was no red tape in those days. It was laborious work. One night I looked up to the second balcony to see an acquaintance, apparently taking life easy, leaning back in a chair with his feet propped on the rail.

"Pretty soft, Spike!" I hollered.

"I'll trade with you any time," he answered.

And we closed the deal then and there. Within two hours he had given me full instructions for operating the Dutch pans (transfer tanks). Open two valves and close two. That was all.

Mutually satisfied, we exchanged jobs. The foreman made no objection when I explained the change to him on his next round. Only then, however, did I receive any instructions about the hazards involved. The foreman warned me about "the foam:"

"When the foam gets too high, you run down two flights of stairs and tell the pump man to stop pumping. Then you go back up, and 'kill' the foam by turning water onto it with that hose. Then you go back down and tell the pump man to start up the pump again."

On that first night I had to make six round trips on account of foam. Soft job! In a week I was run ragged.

That Dutch pan job was a hazard when I took it. The gage would show "no juice," but the open 10-ft. tank could be ready to overflow, foaming up like a double-dip ice cream cone. And over the top it might come at any time, in spite of the "no juice" reading. Back in those days it was all right for the operator to recline, or even to doze, between charges, provided the tank did not overflow.

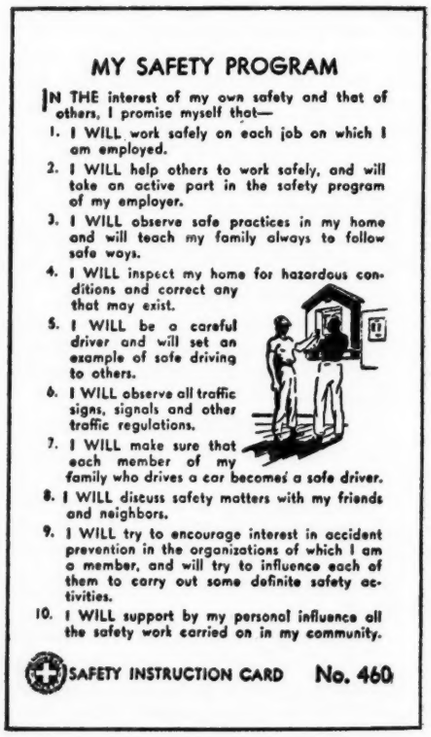
To save myself the excessive fatigue of sprinting down and up two flights of stairs to warn the pump man to stop or start his pump, I persuaded the foreman to instruct the mechanic to install a pipe from my station down to the pumps. He put on it a combination mouthpiece and a whistle, which you will recognize as the old-fashioned speaking tube. From then on I didn't have to tear up and down the iron stairs. This avoided or prevented such accidents as "slipping on wet stairs," "dropping from exhaustion" or "having an overflow." And thus I was able to enjoy a few rest periods between charges.

A bucket of smelly mutton tallow found its way to my station. I don't know who introduced the idea. A ladle of this tallow now and then could be used to break or kill the foam. The number of hosings needed dropped considerably (and the extra amount of water to be evaporated was eliminated). This gave more rest periods. The balance of the season was easy—no accidents, no overflows occurred.

Why Safety Was Improved

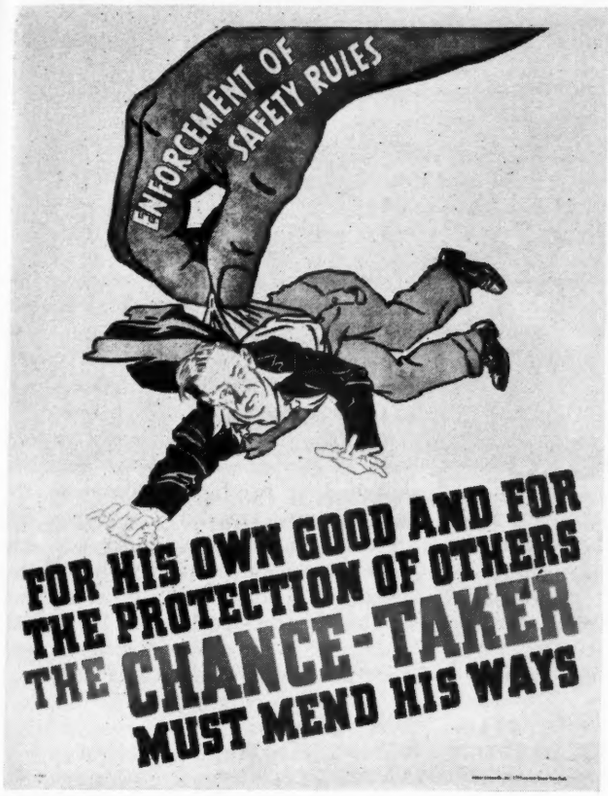
It is important to analyze the reasons why my early efforts resulted in improved safety.

My boss had cooperated in putting through my two suggestions. Furthermore, he made me think of safety as


MY SAFETY PROGRAM
IN THE interest of my own safety and that of others, I promise myself that—
1. I WILL work safely on each job on which I am employed.
2. I WILL help others to work safely, and will take an active part in the safety program of my employer.
3. I WILL observe safe practices in my home and will teach my family always to follow safe ways.
4. I WILL inspect my home for hazardous conditions and correct any that may exist.
5. I WILL be a careful driver and will set an example of safe driving to others.
6. I WILL observe all traffic signs, signals and other traffic regulations.
7. I WILL make sure that each member of my family who drives a car becomes a safe driver.
8. I WILL discuss safety matters with my friends and neighbors.
9. I WILL try to encourage interest in accident prevention in the organizations of which I am a member, and will try to influence each of them to carry out some definite safety activities.
10. I WILL support by my personal influence all the safety work carried on in my community.
SAFETY INSTRUCTION CARD No. 460

Safety instruction card prepared by National Safety Council for giving out to employees. Men who attend safety meeting should always carry away something in their hands as well as in their heads and hearts.

* Mr. Smith's article is based upon a paper presented to the Food Section, National Safety Council, Chicago, October 6, 1941, entitled "Keeping the Interest of Employees." Mr. Smith is chairman of the one-year-old Sugar Industries Committee of the Council.



Poster designed to aid in making employees actively interested in safety.

something of value when he shook hands with me at the close of the campaign:

"Good-bye, Smith. You can come back here any season. Your safety record with those tanks was fine."

The foreman backed me up when I suggested a labor saving device. Labor saving always cuts hazard possibilities.

My job was easier.

His praise at the end of the season made me feel good. It aroused my interest in safety.

Maintaining Inspiration

If we gain inspiration at our annual meetings of the National Safety Council and remain inspired throughout the ensuing year, it means that our respective safety programs are well in hand and that we are able to keep the interest of employees. When our inspiration wanes, the interest of the employee cools as a reflection of our own slowing down or failure to continue with plans for keeping that interest keen.

This phase of accident prevention—keeping the interest of employees—turns out to be more than a mere phrase. In fact, after summing it up, I find that it is the whole works behind a successful safety program. Everything else will fall in line if we succeed in keeping the interest of the employee.

If this interest is the sole answer to our prayer for safety, we must decide, first of all, who are "employees"?

The presidents of your company and mine are employees. Department heads, operators and sweepers are employees. You and I are employees. "Keeping the interest" starts with the safety men themselves. Keeping the interest of the safety men can find no better source of stimulation than active participation and interest in the work of the National Safety Council throughout the year and in the Annual Congress.

Keep close contact with other members of your industry. Swap experience and accident data. Benefit by suggestions of your competition. Safety is one thing that competitors will discuss freely. It affects the lives of men. The safety man's job is to sell *Safety*, and to sell it we need to be "sold" ourselves.

Interest must start at the top. We must arouse and perpetuate the interest of our president, vice-presidents, production heads, engineers and office workers, foremen, operators, sweepers—all.

The man at the bottom should know about it. When I say " know about it," I mean that we must publicize the accident-prevention activities. A letter to the individual foremen announcing a safety meeting is not enough. Place a notice of the meeting on your bulletin board so that no employee can miss it. Don't make it a secret affair. All employees are thereby reminded of the activity. The worker develops a little competition in making suggestions to his foreman. He attempts to do what his foreman is being instructed to do.

If you have shifts in your industry, and only the foremen of a day shift attend a meeting, be sure to send a copy of your minutes to the foremen on all three shifts. Print the names of the men who attended the safety meeting and describe their suggestions in full detail. When the other foremen come to their meetings they will bring something that they consider of more importance than their alternates did.

Develop Competition

Men like to see their names in print. It's a natural thing. Pictures speak louder than words to the majority of workers, especially in a community where illiteracy is still plentiful. Take snapshots, action pictures, of your men at work wearing safety equipment, goggles, respirators and the like. Give them a good write-up and post the work on your bulletin boards for all to see.

Give Credit Where Due

Show "before and after" pictures of hazards and their correction. Tell the story about an employee who designed a safety tool that has stopped a particular type of injury, and give credit to the man who suggested it. Tell the story of the completion of a construction job with full credit to the foreman and workers who handled the work without accidents.

If you have been training a first-aid class, make use of your graduates by giving them an occasional assignment to safety work such as making a plant inspection.

Physical Reminders

Give something to every man who talks to you on safety matters. Men who attend safety meetings should always carry away something in their hands as well as in their heads and hearts. It can be a poster for the department bulletin board, a report of the monthly accident record, or a souvenir of some kind such as a copy of "The Safe Worker," "Safe Driver" and the like.

Have something for the individual who merely talks to you. It can be a book of safety matches, or a pencil with the company trade-mark and a safety thought printed thereon. Match books, calendars and pencils will find their way into their homes, and we all know that "interest of employees" should reach the employee's family.

Give something to every person you talk to. Something they can handle and carry away with them. It will remind them of safety and will carry the news out of the plant and into the home.

Three Things to Do

1. Decide who are the "employees."
2. Do not confine your safety activities—advertise them!

3. Make use of all who have special talent.

There is another tool that good management uses for keeping the interest of employees. That tool is discipline. One large company says: "You not only must *ask* men to work safely; you must *require* that they do so." This plan keeps the interest of those few who are not stirred with the proper spirit or ambition. It causes men to study their books of safety rules and to protect their earnings, for they cannot afford to lose time by failure to work in a safe manner.

Discipline has its place in safety. Men must protect themselves and their jobs by obeying safety rules.

Meat Man Apes Bakers With Store on Wheels

Uses standard, low-cost truck chassis and body equipped with plug-in refrigerated showcase and storage box. Gets premium prices for meats. Sales average more than dollar per customer.

ONE of the latest developments in the house-to-house merchandising of food products is a traveling meat market built up on a standard, light, 1-ton step-in drive chassis and a standard body fitted with a customer's showcase and a storage box refrigerated by mechanical means to keep the meats in prime condition. Both the standard chassis and the standard body are readily available, leaving only the interior equipment and refrigerating means to be ordered specially to suit the needs of the trade.

In operation, the mobile meat market follows closely the method of merchandising first employed so successfully through the medium of the motor truck by bread and cake distributors. As compared with setting up the same business in a fixed store location, the use of the truck equipment enables the independent merchant to cover a much larger territory than that from which customers would normally travel to a store in a fixed location.

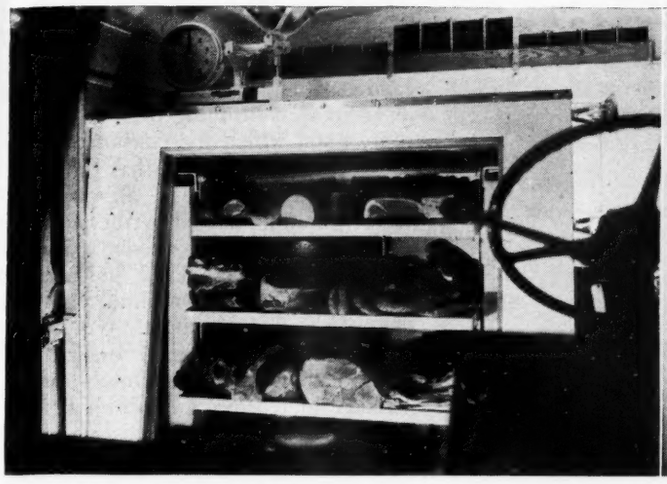
This larger selling area in turn makes possible a larger sales volume. In addition, higher prices may be charged for the merchandise, since it is brought by truck to the housewife's door—to her kitchen door in many instances—and thus relieves the customer of meat shopping trips and of carrying heavy purchases home when other means of delivery are not provided.

Through effective lettering and other advertising on the truck body itself, the meat merchant with the mobile unit obtains the benefit of display advertising in neighborhoods where billboard advertising is not permitted.

The fact that the house-to-house sale of meat has not attained the popularity or extent of the sale of bread or cake by the same means has been due in part to the necessity of having to purchase a special truck, body and equipment. Now with the need of ordering only the special equipment fitted into a standard chassis and body, the sale of meat on such mobile units may be expected to increase.

One of the most recent of such successful operations is that of Tom Nicholson of Lakewood, Ohio, a suburb of Cleveland. Mr. Nicholson serves about 180 customers in the suburban districts of Cleveland, calling on each one every other day. These customers are city workers, most of whom live in their own detached or two-family houses in the suburban areas covered. His average sale amounts to over one dollar per customer. On Saturdays, it is well over two dollars. The daily stock of meats carried on the truck is valued at over $200. The truck itself covers an average of 45 miles per day. To date it has run about

With her arms full of meat purchases, a smiling Cleveland, Ohio, housewife leaves Tom Nicholson's traveling meat market, a standard International chassis and standard Metro steel body. Below, Mr. Nicholson adds a side line of canned goods, carried on the insulated metal housing over the truck's engine.



At the left, appetizing array of meats on the shelves in the customer's glass-front showcase, as seen through truck's windshield. Note position of steering wheel, scale on top of showcase and, to extreme right rear, hinges of door leading into truck's cold storage box. At right, close-up of showcase and Mr. Nicholson and one of his customers digging into her purse.

18,000 miles and has been in operation slightly over one year.

The truck used by Mr. Nicholson is a standard International Model K-3-M 1-ton chassis of 113-in. wheelbase with a standard 9½-ft. Metro steel body. The 9½-ft. body length is the clear space behind the driver's compartment. Other body dimensions are width, 70 in., and height, 67½ in. The total capacity is 280 cu. ft.

The special interior equipment consists of a glass-faced showcase, a refrigerated storage box and the refrigerating means itself. The showcase is set crosswise of the body on a transverse line between the rear edges of the side doors.

One end of the showcase abuts the body wall on the right-hand side. The opposite end of the case is about three-quarters across the width of the body. This leaves an aisle between the end of the case and the left side of the body.

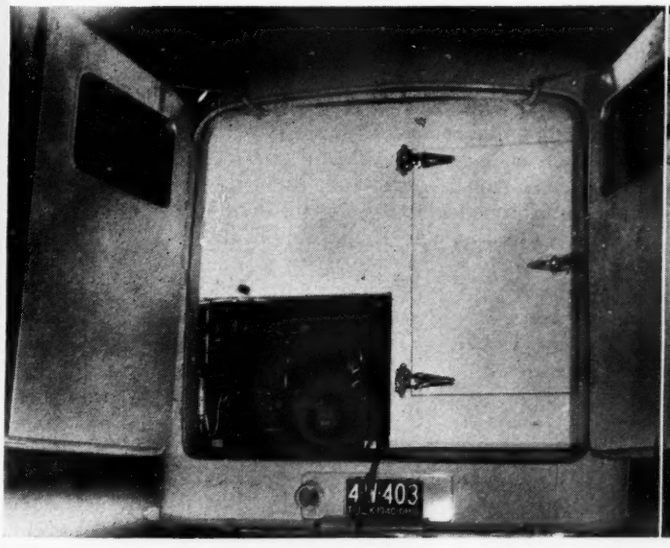
The left-side aisle as just described gives access to an open space clear across the body from the rear of the showcase to the front of the cold-storage compartment which extends across the body from the rear of the open space to the rear of the truck body.

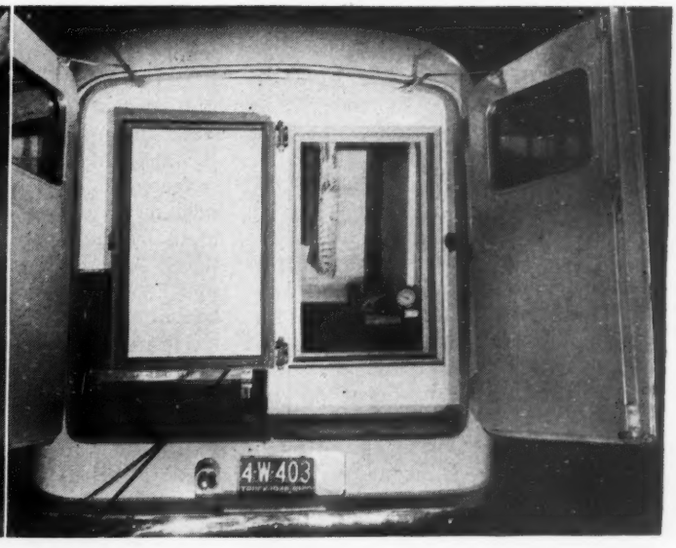
The open space between the rear of the showcase and the front of the storage box is utilized to get meats out of the showcase when sold and to replenish the shelves of the latter with new cuts out of the cold-storage box without having to go outside the truck.

In this open space, Mr. Nicholson has a small wooden block on which he cuts his meats. When not in use, this block is folded back against the right side of the truck. Also in this space, built against the door on the front wall of the cold storage box, is a rack in which his cutting knives, cleavers and saw are held securely in place.

The interior of the truck's cold-storage box may be reached from the rear as well as from in front through the open space between it and the rear of the customer's showcase. This rear entrance is through the double set of rear doors.

The outer set of doors protects the refrigerating mechanism and the door leading to the cold-storage box. This is used to stock up the box at night.





These two views show truck's set of double rear doors. That at left shows the Kelvinator refrigerating system and the plug-in line from the garage lighting circuit. A temperature of 28 deg. F. is maintained in cold storage box and showcase overnight and to the start of the route in the morning. At end of route it does not exceed 35 deg. View at the right shows rear entrance loading door of cold storage box. Driver also has access to storage box through space between it and showcase at front of body.

The Packer's Liability For Defective Food

By ALEXANDER SCHAMBAN
Attorney, Philadelphia, Pa.

Conditions have changed and so has the law. Today the food manufacturer may be held liable for injury to the consumer of a packaged product, even though the product is handled by two or three middlemen. The author explains the various aspects of this liability

THE consumer of packed or canned food, until comparatively recent times, had no right of action for damages against the manufacturer or packer for injuries sustained because of deleterious matter. United States Courts, following the English Common Law, held that recovery was barred since there was no privity of contract between consumer and packer or maker.

Changing conditions and times have made widespread changes in the law. Today, the consumer can sue the manufacturer even though the latter's products went through two or three sources of sale before reaching the ultimate buyer. Our courts have established the rule that every manufacturer or packer of food in a sealed bottle or original package is held to represent to each purchaser, even though the sale is made through a dealer, that the contents are wholesome and suitable for the purpose for which they are sold.

The manufacturer must use a high degree of care to see that the food is free from foreign or deleterious substances that may injuriously affect the user. Some courts have held the manufacturer accountable for foreign matter on the theory that negligent packing resulted in the deleterious matter while other judicial trends lean toward establishing responsibility as a "matter of social justice."

Whatever the basis of legal right of action, there are many phases to the question of what proof must be furnished by the complaining consumer. Some courts insist that the plaintiff clearly show negligence on the part of the packer or manufacturer. Other courts hold that the mere happening is sufficient to shift the burden of showing freedom from negligence to the defendant.

The majority of state courts have held that evidence of injury as the result of a container bursting or injury from foreign deleterious matter or the unwholesomeness of the food establishes a case. The defendant must then clearly prove that the product was free from any cause that resulted in the injury. The defendant may also have to prove the process of packing and manufacturing in all detail so that a jury might determine whether the manufacturer exercised the highest degree of care.

However, many judicial opinions apparently indicate that the very happening of the injury as the result of an obvious defect or deleterious substance is sufficient to establish negligence, to overcome which, the manufacturer must present the strongest of counter proof.

Labels and Advertising

Aside from this theory of negligence, manufacturers and packers face possible liability on another theory.

Section 12 of the Uniform Sales Act, adopted in practically all of the states, defines express warranties as affirmation of facts if the natural tendency of such affirmation or promise is to induce the buyer to purchase the goods.

Statements of fact as appear in advertisements or labels have been considered as express warranties if relied upon by the buyer. Therefore, if the buyer or ultimate consumer receives injury, a right of action might exist against the manufacturer for breach of a warranty. Recovery of damages would be limited to actual loss without compensation for pain and suffering.

Interjected as a defense in the warranty case has been the fact that no contractual relationship existed between manufacturer and ultimate consumer that would support any claim. In response to this contention, several courts have held that the manufacturer, in distributing his product, knew that the wholesaler or retailer was merely acting as a conduit until the product reached the ultimate consumer for whom the item had been originally intended. The middleman was acting as agent in continuing the express warranty upon which the consumer relied.

Recent cases indicate that the courts feel that the warranty, although not directly communicated by the packer or producer of a food product, should, nevertheless, be resolved in favor of the consumer to afford him a remedy against the manufacturer.

Courts have expressed their reluctance to allow the manufacturer to escape liability merely on the fiction that no contractual relationship exists with the consumer. Food products, intended for human consumption, are expected to be produced with the highest degree of care, and the existence of deleterious matter should be sufficient to force the food packer to establish freedom from fault.

The courts contend that the manufacturer, by selling food in sealed containers, has prevented the retailer or consumer from examining the product and that these individuals rely on the representations that the food is wholesome and fit for consumption.

Strangely enough, some packers or manufacturers feel that it is sufficient to distribute the products and dismiss any thought of further responsibility. The old theory, as expressed by early cases and now discarded, that the consumer cannot recover because he did not contract with the producer, is too harsh to find further recognition. Good business, as well as moral ethics, recognizes that the manufacturer must accept responsibility for matter foreign to the product.

Implied Warranty

Present in the sale of all merchandise, be it food or some other commodity, is an implied warranty as to fitness. The buying public has a right to rely on the quality of the products sold, and an effort to evade responsibility for negligence on possible technical grounds must react as a boomerang against the packer or manufacturer.

Courts have gone so far as to allow retailers who have been held responsible for deleterious matter to recover their loss against the erring manufacturer who failed to defend a claim. Occasionally, manufacturers have endeavored to evade financial liability by refusing to assist the retailer when the latter has been sued. In that event, the retailer may recover, not only the verdict given in favor of the injured customer, but also all the expenses he incurred in defending the lawsuit.

NEW PACKAGES & PRODUCTS

Vitalized Juice

THE UPSWING in fortified foods continues, with "Gusto," a blend of four vegetable juices, the latest enriched drink to be distributed. Gusto, a blend of tomatoes, celery, spinach and parsley fortified with vitamins B_1, B_2 and D is packed by Francis C. Stokes Co., Vincentown, N. J., who claims its product to be the first canned food to contain virtually a complete schedule of daily vitamin requirements.

In preparing and packaging its new product, the company considered both the growing demand for vitamins and what it believes to be a trend toward public acceptance of informative labeling. Every 12- and 46-oz. can of Gusto has a chart on the label, showing for consumer benefit the average daily vitamin requirements of adults compared with the vitamin contents of the can.

Cheese in Casing

SHOWING THAT one food industry can learn from another, South Kaukauna Dairy Co., Kaukauna, Wis., is making a bid for public favor with smoked cheese in sausage casing.

"Kaukauna Klub," 8-oz. hickory-smoked cheese, is a cheese food mixture of aged American cheese with added cream, milk solids and dextrose, with a maximum moisture content of 40 percent and a minimum fat content of 25 percent. The cheese is packed in a regular fibrous sausage casing, and then smoked in a specially built smoke house for 36 hours. It is then dipped in hot wax for sealing purposes, and wrapped in red and silver translucent cellulose. The company puts out another product

in sausage casing—an appetizer cheese flavored with onion.

Chocolate Dessert

"TUMBO" PUDDING, a new prepared dessert in chocolate flavor, has been developed by Taylor Reed Corp., Mamaroneck, L. I., manufacturers of chocolate sirup. Containing a blend of sugar, cornstarch, cocoa, salt and artificial vanilla flavoring, the dessert is fortified with iron, 5 mg. per ounce, and 100 International Units of vitamin B_1 per ounce. The preparation may also be used in making chocolate cream pie.

Taylor Reed is marketing its Tumbo chocolate pudding in a handy, sealed duplex package of transparent cellulose, with printed directions for easily tearing the container open at one corner.

Olive Oil Substitute

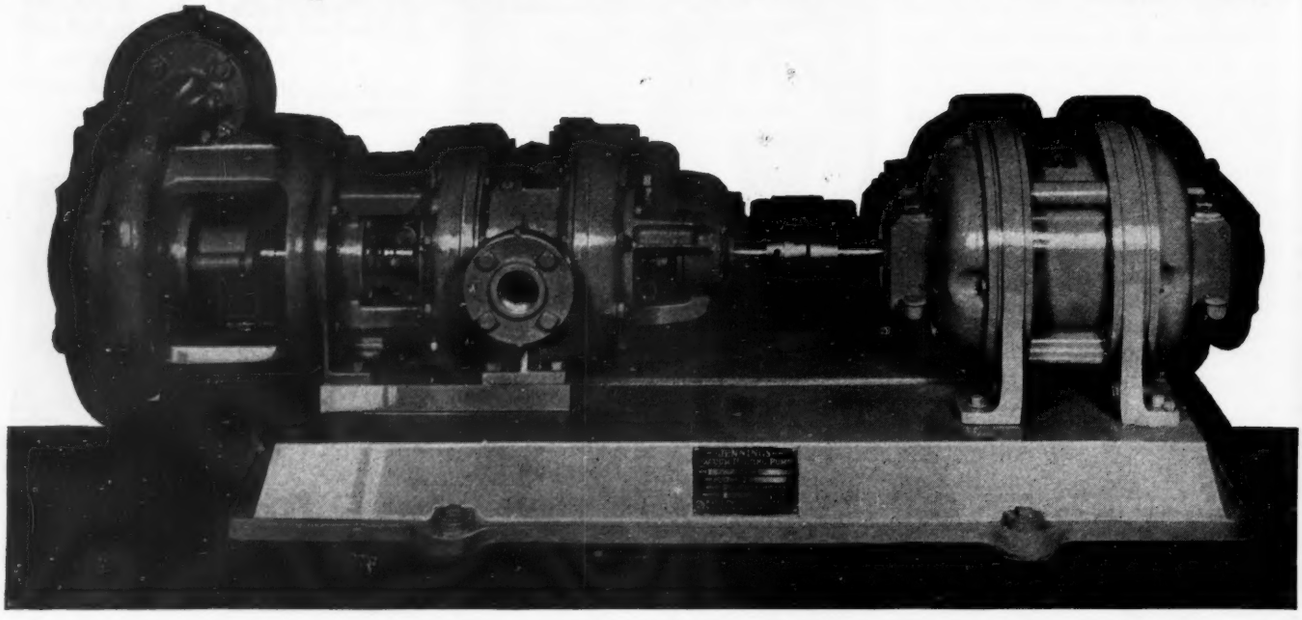
THE WAR having developed a shortage in olive oil, an imitation olive flavored soybean oil has been rushed into the breach by Suzanne Processed Oil Co., Boston, Mass., as a substitute product to be used in cooking and in dressings.

"Suzanne" soybean oil contains butyric acid and esters, with artificial color added. It is distributed in attractive 2-oz., 4-oz. and 8-oz. glass bottles of modified dumb-bell design with a square center.

Special Vitamin Drum

TO MARKET its thiamine hydrochloride, vitamin B_1, Merck & Co. Inc., Rahway, N. J., has developed a new 1-kilo fiber drum of highly functional design. This drum has no separate inner container, but a complete lining of rubber hydrochloride adhered to the drum wall and a transparent inner cover of cellulose acetate. Both of these departures in packaging protect the cleanliness and purity of the product.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

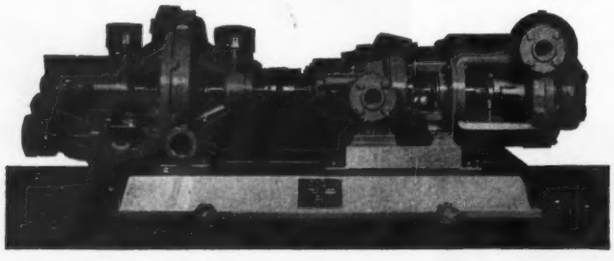


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK · CONNECTICUT, U. S. A.

FOOD INDUSTRY NEWS

British-Combine

BRITAIN'S SHORT RATIONS

This picture compares the amounts of four basic foods available to an Englishman with that eaten by the average American. At left in giant spoon are weekly rations of butter, meat, sugar and eggs per English adult. At right are average American's consumption of same foods per week. The Englishman gets 1 egg, 8 oz. of sugar, 35 cents worth of meat and 2 oz. of butter. The American eats 5 eggs, 2¼ lb. of sugar, 2½ lb. of meat and 6 oz. of butter.

Canadian Bakers Economize

To ASSIST Canadian bakers in reducing their costs without interfering with the quality of their bread, the Wartime Prices and Trade Board has prohibited the sale of sliced bread, the use of multi-colored wrappers and the special delivery of bread. It is estimated that this will save one-fourth of a cent or more per loaf of bread, which is equal to what is regarded as a satisfactory net profit.

Plastic from Sugar Cane

RECENT PUBLICITY has been given to a new outlet for sugar cane bagasse. A thermo-setting lignin plastic is being made on pilot plant scale by Valentine Sugars, at Lockport, La. It is said to be highly water-resistant and tough, yet possessing good flow properties.

Food Equipment Priorities Still at Promise Stage

Plans to care for needs of food industries develop slowly, but broad outline appears

APPARENTLY food equipment manufacturers and purchasers are going to find available to them soon, possibly by the time this is read, three kinds of priorities. The variations in priority granted depend upon the purpose for which equipment, parts or supplies are needed. This is about the way it seems to be working out:

1. For emergency repairs to prevent the shut-down of any plant making a defense food, or one important to the general public, a very high priority is usually available. In analogous cases, the mining industry gets an A-1-a priority for these emergency repairs. There was not a comparable blanket priority for food plants arranged by mid-October. But the same general principle was applied in individual cases.

2. To build up a reasonable stock of spare parts and supplies, a much lower level of priority is granted to comparable companies. For plants urgently needed for defense food manufacture, the rating will presumably be comparable with the mining rating of A-8 or other ratings of A-10. But only a B class rating is usually at present granted for food plants of mere general-service value.

3. For new plants or plant expansion, the degree of priority granted depends on the urgency of the need for the increased capacity as judged by the government. All these priorities are judged individually. Some of them, as for egg-drying facilities, or evaporated and dried milk units, are very high indeed.

What Is Defense Food

There is no official definition of "defense food". But the government men have a pretty good idea what this general term means. It is intended to describe those classes of food for which the need is very urgent for Army, Navy, Lease-Lend or public-health reasons. Usually these foods are things like dried eggs, evaporated milk or dried milk, cheese, smoked ham and bacon, and the other things which are transportable without refrigeration to England. Also important are the Army and Navy supplies whenever our new insular bases require special foods not commonly available in sufficient quantity.

It is not expected that defense foods will be developed to the point that the rest of America shall not eat. Obviously, a regular supply of manufactured and processed food of most ordinary sorts is just as essential for civilian purposes as is the routine food supply for the Army. Some changes in diet are expected. But in general the ordinary classes of food as manufactured for civilian use will not either need or get very high priorities. If this subject is handled for food as it has been heretofore handled for other commodities, only a *B* priority will be granted. Nevertheless, in some special cases a higher level of *A* priority will be assigned if this becomes imperative for the general good.

Luxury Foods Hit

Luxury and strictly nonessential food items will probably get little or no priority. In most cases, the luxury foods will have to worry along with equipment, supplies, repairs, and even maintenance materials, altogether without priority or official assistance.

New Machines for Food Plants Will Be Shown

Significant new developments in supplies and equipment for the food processing industries will be exhibited at the Exposition of Chemical Industries, in Grand Central Palace, New York, December 1-6. There will be more than 300 exhibits, with several hundred products on display. These products will range from chemicals and corrosion resistant metals to processing, controlling, materials handling and packaging units.

Outlook Excellent For Meat Packers

Production and demand greatest on record. Promotion program effective; will be continued

ENCOURAGED by the outlook for increased production, increased consumption and increased profits in the meat packing industry for 1942, American Meat Institute held a record-breaking annual meeting at Chicago, Ill., October 3-7. This year's attendance of 2,380 is 50 percent over last year's record registration.

George A. Schmidt, chairman of AMI, estimated meat production and consumption during 1941 to be the greatest on record. Pork production alone appears to be lower than in 1940, about 5 percent. Beef production is running about 9 percent ahead; veal, about 2 percent; lamb, about 6 percent; and exports are about four times greater than in 1940.

The Institute's educational program acquainting the consuming public with meat's nutritive value has proved so beneficial that it is to be continued with emphasis on the thrifty cuts, to the end that the consumption volume will not shrink as a result of increased prices.

Summarizing the outlook for the coming slaughter year ending October, 1942, C. A. Burmeister, Bureau of Agricultural Economics, U. S. Department of Agriculture, forecast a Federally inspected slaughter of 52,000,000 head of hogs, compared with 50,000,000 head for the slaughter year just ended. Shipment of about 1½ billion pounds of pork and lard is expected during 1942; this amount being about equal to that exported during the 1916 and 1917 war years, but less than that shipped in 1918.

Total beef slaughter for 1942 is set for about 26,000,000 head of cattle and calves, an increase of 10 percent over 1941, which would be the greatest slaughter on record.

Sheep production and lamb slaughter prior to 1941 have been relatively stable, but 1941's lamb crop is the largest on record. It is 1,700,000 head, or 5 percent greater than last year. An increased slaughter for 1942 is expected.

No Meat Shortage Expected

The total meat production of 20½ billion pounds for 1942 will be about the same as in 1941, but 1½ billion pounds greater than in 1940, and will include less pork but more beef. With a supply of approximately 140 lb. per capita for domestic consumption over the export requirements, no shortage of meat in 1942 is expected.

Because of a favorable corn-hog ratio, a heavy pig crop is expected for next spring, with a resulting heavy slaughter of fat heavy hogs during the 1942-43 winter. With the cow cycle in its 5th year of the customary 6 to 8 year upswing, its peak is expected in 1943 or 1944 with a total cow population of 78 to 79 million head, 4 to 5 million more than the peak reached in 1934.

AGAIN HEADS AMI
George A. Schmidt, Stahl-Meyer, Inc., New York, was reelected chairman of American Meat Institute at the convention in Chicago last month.

Reporting results of his survey of American meat eating habits, Elmo Roper pointed out that people eat meat because they like it and eat more than they think they do. Results of his survey show that consumption of meat would tend to decrease progressively if people based their consumption of meat on factors other than eating that which keeps one from becoming hungry the longest.

Lt. Col. Paul P. Logan, U. S. Army Quartermaster Corps, reported a working relationship between the Army and the meat packing industry which permits the industry to set up production lines to supply systematically and to schedule 2,000,000 lb. of Army style boneless beef weekly. A similar plan for other standard meat items is likely to result.

Anticipated requirements of the Army for food during 1942 include 277,000,000 lb. of fresh meat and sausage, 82,000,000 lb. of cured and smoked meats, 26,000,000 lb. of canned meats, 50,000,000 lb. of butter, 50,000,000 lb. of poultry, 55,000,000 doz. eggs and 7,500,000 lb. of cheese.

Much development work is yet to be done on canned meats. A sterile 6-lb. can of luncheon meat has been developed thus far.

G. G. Fox, vice-president, Armour & Co., announced that the Institute's standards for lard have been accepted by the industry.

Argentine Pact Hits U.S. Foods

Lowers import duties on number of foods, while non-food lines benefit from concessions

ARGENTINA has joined the ranks of Latin American countries entering into direct trade agreements with the United States. The agreement with the Argentine was signed amid sharply conflicting reactions from American farm and food interests, but with considerable fanfare from official Washington about the deal's strategic significance in the international political picture.

Loudest among American complaints came from Western cattle interests against the principal American concession, reduction from 6 to 3 cents per pound of the duty on prepared or preserved meats. From the food industry standpoint alone, it is true that the agreement gives more than it gets. A number of other food import duties were reduced sharply, while Argentina's concessions were principally in non-food lines.

Other important food imports upon which the United States granted concessions include:

Casein or lactarene, from 5½ to 2¾ cents per pound; tallow, from 3½ to 1¾ cents per pound, oleo oils and oleo stearin, from 4 to 2 cents per pound; jellies, jams, marmalades and fruit butters, from 20 to 17½ percent ad valorem; dog food, 20 to 10 percent ad valorem; Italian type cheeses, from 7 cents or a minimum of 35 percent ad valorem to 5 cents or a minimum of 25 percent ad valorem; fish preserved in oil, reduced to 22 percent ad valorem on value up to 9 cents per pound, 15 percent ad valorem over 9 cents; macaroni, etc., 3 to 2 cents per pound (made with egg), 2 to 1½ cents per pound (without egg); tomatoes, prepared in any way, from 50 to 25 percent ad valorem.

The United States obtained concessions, in the food line, principally on fruits and fish. Fresh apples will get a 50 percent seasonal tariff reduction. Prunes will be exported under a 30 percent lower tariff; raisins, 35 percent lower. Canned fish will enjoy a 40 percent lower tariff; sardines, 30 percent lower.

In addition to specific item concessions, the agreement contains the most-favored-nation clause and numerous monetary exchange provisions designed to facilitate the flow of trade.

Cold Storage Space Ample

THERE IS ample refrigerated warehouse space to preserve the nation's perishable food supplies for both civilian and defense needs, according to a survey by the Office for Emergency Management.

Dairy Industry To Be Expanded

Government-sponsored program now being planned to take care of Lease-Lend needs

THE dairy industry, from cow to can, is next in line for a government-sponsored expansion program to provide needed additional capacity for Lease-Lend requirements.

A dairy industry committee will be set up this month in the Food Branch of OPM's Purchases Division to work with the Surplus Marketing Administration, farm groups, processors and others in outlining a program. Additional capacity for drying milk and for making cheese are almost certain to develop, but the committee also will be charged with compiling the needs of the industry for priority assistance all along the line. Simplification and conservation in the use of critical materials also will be subjects for the committee's attention.

Insofar as expansion is needed, it probably will take the form of the egg-drying program which both OPM and the Department of Agriculture agree has been fully met. Additional facilities in this line were financed with private capital in cooperation with SMA, and given an A-1-g priority for needed materials.

Expansion of facilities in other lines to meet lend-lease requirements is considered the first responsibility of SMA. Food processing facilities for filling all civilian and American military requirements are adequate, according to the Food Branch.

Dehydration of vegetables may follow dairy products for expansion if the British decide to order large quantities of these products. So far, SMA has found little enthusiasm in British supply circles for this type of product.

With the creation of a dairy industry committee, the Food Branch will have five well defined industry groups assisting the staff of Chief Howard Cunningham. Canning and baking committees have been at work for some time and a distribution committee also is nearly set up. In addition, a fresh fruits and vegetables committee is working with John Martin, in the Chicago office. Additional committees to handle poultry products and meat packing will be organized shortly, with others to follow. There is no plan to form a top central over-all food committee, officials feeling that the problems of individual components of the food field are too varied for such a super-body to be effective.

Wide World

FEATURE ATTRACTION

Perhaps the most interesting part of the first annual Peanut Festival held at Edenton, N. C., on October 20 was the girl who wore the peanut crown. The name is Rachel Weeks; the address, Tarboro, N. C. She was selected from 16 contestants to reign over the festival. Her picture would get free publicity for any food.

FIRST LADY AIDS COFFEE

Mrs. Franklin D. Roosevelt recently launched her new radio program, "Over Our Coffee Cups," broadcast on Sunday evenings over the NBC blue network. Here she is discussing the script with Eurico Penteado, chairman of the Pan-American Coffee Bureau, sponsor of the program.

To Simplify Glass Jars

REPRESENTATIVES of the glass container industry have been invited to cooperate with the Department of Commerce and the Office of Production Management in a program of simplification and standardization.

Puts Brakes on Food Enrichment

National Research Council will not recommend fortification of any additional foods now

THE Food and Nutrition Committee of the National Research Council, quasi-governmental scientific advisor to the National Defense Nutrition Committee, has formally decided against recommending vitamin or mineral fortification, enrichment or restoration of any additional food products for the time being, presumably at least for the duration of the war. The Food and Drug Administration is understood to be fully in sympathy with this stand.

The effect of this move apparently means that only those foods for which some form of enrichment has been officially put into effect or recommended will have much chance, within government standards, of adding artificial vitamins and minerals. These foods are bread, flour, milk, margarine and salt.

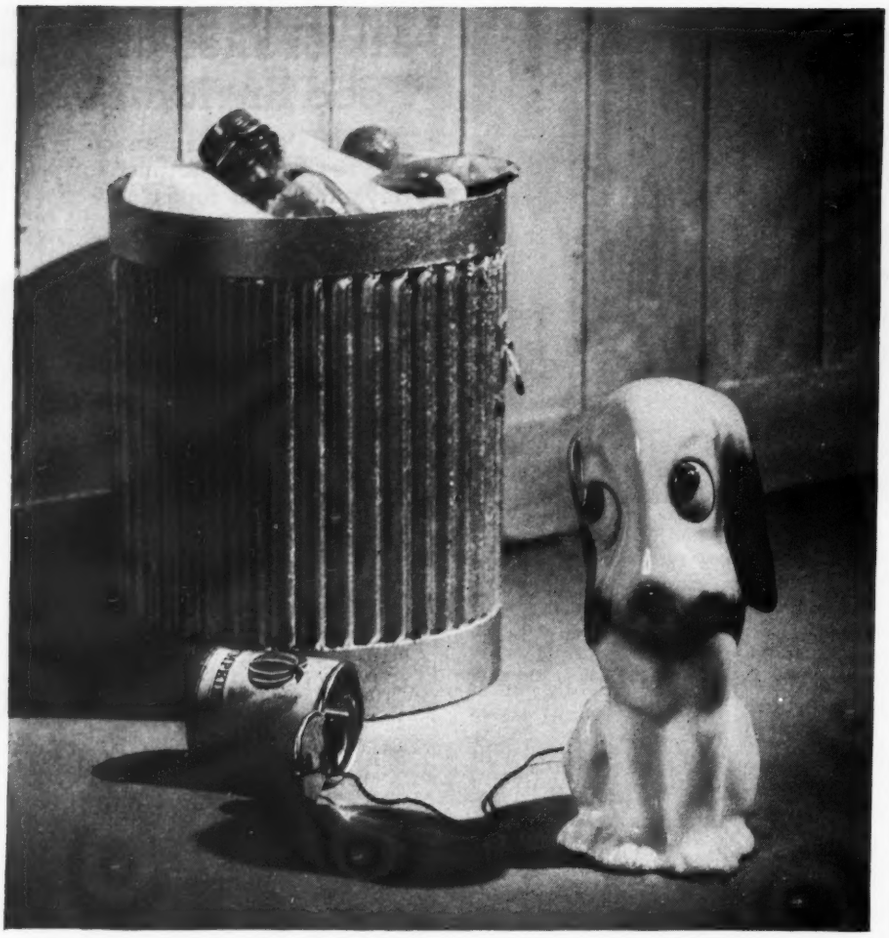
Wages for Evaporated Milk Industry Fixed

EVAPORATED milk workers have been found to enjoy a variety of minimum wages, depending on the section of the country. Under the Walsh-Healey Public Contracts Act, the Secretary of Labor has determined that 50 cents an hour is the prevailing minimum wage on the Pacific Coast in the States of Washington, Oregon and California. Forty cents an hour "prevails" in the States of Idaho, Montana, Nevada, Utah, Arizona, New Mexico, Colorado, Wyoming, North and South Dakota, Nebraska, Minnesota, Iowa, Wisconsin, Michigan and Ohio. In the remaining states and in the District of Columbia, 32½ cents per hour is the prevailing minimum wage.

November 3 is the effective date, on and after which these minimum wages shall apply in manufacture of products to be sold to the government under all contracts subject to the Walsh-Healey Act.

AMS OK's Defense Food

PURCHASE of processed foods by Army, Navy, Lease-Lend and other government agencies, is based on Federal specification. Approximately 125 AMS inspectors are working all over the country, cooperating with food manufacturers to see that production complies with AMS standards. Inspection is at the processor's plant so that only accepted material is shipped.

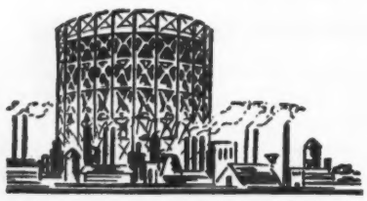


A DOG'S LIFE

Your job these days may make a dog's life seem downright attractive. But getting production *at a profit* is a lot easier in some plants than others.

That's why so many famous names in food depend on the Kemp Industrial Carburetor and Kemp equipment for quality control and economy in roasting, toasting, high-temperature cooking and can-making operations.

Fuel savings of 15 to 40 percent are the rule wherever Kemp equipment goes to work. Let us outline for you the scope of Kemp services and suggest what you may expect of Kemp in your job. Address the



C. M. Kemp Manufacturing Company . . . 405 East Oliver Street, Baltimore, Maryland.

KEMP of BALTIMORE

Bakers Discuss Their Problems

Reaction of public to enriched bread reported. Cake operations criticized for inefficiency

ENRICHED bread came in for much attention at the annual meeting of American Bakers Association, held in Boston, October 12-15. Dr. Russell M. Wilder, chairman of the Committee on Food and Nutrition, National Research Council, told the 1,200 bakers in attendance that the government's program of support and consumer education has only started. And M. L. Wilson, Assistant Director of Defense, Health and Welfare Services in Charge of Nutrition, indicated that science and the government would give full support to the baking industry's effort.

A national consumer study on enriched bread reported by Dr. James A. Tobey showed that 63 percent of the people are familiar with enriched bread and about half of those interviewed are now buying it. But 60 percent emphatically stated that they would not pay more for enriched bread.

In the opinion of Peter G. Pirrie of *Bakers Weekly*, bakers have been a bit over-optimistic about enrichment, and said that the new bread provided no automatic answer to unsatisfactory sales volume. Much more remains to be done, he pointed out, to equip clerks and drivers to carry the idea to consumers. Milton Petersen, P. F. Petersen Baking Co., Omaha, suggested more intensive advertising on the part of bakers to put over enriched bread. In one case, in Madison, Wis., the bakers cooperated in such a promotional effort.

Cake Sales Up

Sales of cakes have increased in the past year under the impetus of defense activity, according to Ralph D. Ward, president of Drake Bakeries Inc., Brooklyn, N. Y. William F. Goodale, Jr., vice-president of Berwick Cake Co., Roxbury, Mass., criticized the industry for lack of efficiency in operating cake plants. In the matter of fuel costs, he said, appreciable saving could be made by reducing the oven temperatures by 10 or more degrees. He also pointed out the fact that his company had cut wrapping time by 25 percent by lowering the wrapping tables. Ellis Baum, vice-president of Continental Baking Co., New York, made the observation that the baking industry has never really sold cake, and he criticized the practice of overstocking stores to the extent of having to take back 40 percent of the stock left.

The advantage of using a stabilizer in

juicy pies was pointed out by George U. Vanneman of the dried-egg division of Armour & Co. The stabilizer jells the liquids and prevents them from soaking into the crust.

Driver Saleswomen

The advisability of using women drivers in house-to-house selling was discussed. Barnard Bake Shops, Inc., Binghamton, N. Y., has done this experimentally with good results. These women are 25 to 30 years of age, with five year's previous sales experience.

Pickle Packers Plan Promotional Program

ENCOURAGED by the findings of its research study of the nutritive value of pickles and by the increasing market demand for pickles, National Pickle Packers Association endorsed plans for an expanded 1942 promotional program at its annual fall meeting in Chicago.

To finance the promotional effort, the Association voted a special assessment of ¼ cent per bushel of pickles made and purchased upon pickle packers and ⅛ cent per bushel upon salters. The public educational program will feature the nutritional value of pickles.

So great has been the market demand for pickles that in spite of increased intake this year over last, the visible supply for the coming year appears to be inadequate.

Butter to Blitz Oleo

TO COMBAT what it calls the "substitute food situation" brought about by the establishment of new Federal oleo standards, American Dairy Association, Chicago, will conduct an aggressive coast-to-coast advertising campaign promoting the merits of butter. To start in the latter part of November, the campaign will include the use of full-color pages in national magazines.

This campaign will be supplemented by intensive merchandising activity at points of sale.

Army Makes Big Purchases

DURING the two weeks ending October 9, Army food purchases made by the Chicago Quartermaster Depot totaled $1,428,696.31. These purchases included, among other things 9,000,000 cans of soluble coffee, 29,700,000 tablets of sugar, 145,000 lb. of candy (components of the Type C field ration), 2,766,430 lb. of fresh frozen boneless beef, 96,000 cans of meat and vegetable stew, 140,945 lb. of chili con carne, 100,008 lb. of bacon and 559,286 lb. of flour.

VEST POCKET PARA-RATION

Spread out here are the items included in the new experimental emergency ration for parachutists and other troops in the field. The ration, enough for three meals, weights only 32.86 oz., yet contains 3,726 calories. It consists of pemmican and graham biscuits, modified malted milk, soluble coffee, sugar, gum, canned veal loaf and luncheon meat, a bouillon tube, "D" ration and lemon-powder pellets. It is packaged in three moisture-resistant cardboard cartons which conserve tin and are light in weight

This job of arming America is no child's play . . . it demands the best from every man, every machine. The responsibility of providing industry with precision-built, hard-working pumping equipment is a task Viking shoulders willingly and with extreme pride.

If your production problem is pumps — stationary, portable, V-belt or direct motor drive, large or small capacity, perhaps Viking can lend a hand. Write, wire or phone today for Viking specifications and prices . . . complete, illustrated bulletins will be forwarded to you by return mail.

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DAMN IT!

— Our Customers Make More Money Than We Do!

It's a fact that the majority of the owners of

FERRY

CONTINUOUS

POTATO-CHIP

MACHINES

show a bigger profit than the makers of them. However, it is a source of satisfaction with us rather than complaint—for we are machinists, not merchants.

Here's why these machines are invariably big profit makers: Starting from raw unpeeled potatoes every operation except inspection of the peeled potatoes is completely automatic and continuous . . . peeling, slicing, frying, drying, cooling and salting are all under "push button control"—And better yet, production costs are far lower than with other manufacturing methods. . . . Made in 5 sizes with capacities from 50 to 350 lbs of chips per hour. . . . If you are in the potato chip business to make money it will pay you to get complete details of Ferry Machines today. . . . Write for Bulletin.

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Advice on Safety Heard at Meeting

Accident prevention should be expressed in pocketbook terms. Safety is individual problem

POINTERS on plant safety were heard at the meeting of the food section of the National Safety Congress at Chicago, October 6-10.

W. H. Scates, insurance manager of the Carnation Co., Oconomowoc, Wis., declared that an accident-prevention program translated into "pocketbook" terms is the most likely to win the approval and support of management and branch managers. He urged the safety program be sold both to top managers and to branch managers in terms of operating costs and net profit; terms which management understands and respects. "A branch manager may not pay much attention to a report of an accident costing $100," he said, "until it is demonstrated the accident consumed the net profit on 10,000 quarts of milk, or about 18½ truck loads of bottled milk."

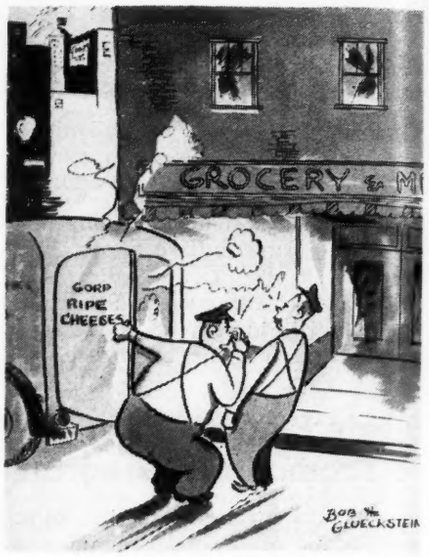
Management often thinks the insurance company is the goat for all accident costs, Scates pointed out, but under the insurance plans of most companies, the accident costs are merely transferred to the insurance company temporarily. In the final accounting they drop right back into the profit and loss account of the business or the branch office.

Scates declared that operating costs can be sharply and extensively reduced immediately by an accident-prevention program that works. Some managers, he said, operate under the fallacy that a safe operation is likely to be a high-cost operation. Those employers should be given a clearer understanding of the relation between their accident costs and their total operating costs. It is the safety engineer's function to see that management gains that understanding.

R. C. Haven, safety engineer for Continental Baking Co., Inc., New York, said that the safety engineer should consider safety education an individual problem, not one to be solved in mass formation. Mr. Haven also recommended a system of accident bookkeeping which will provide a complete record of each employee's accidents, their cost, damage, personal injuries and remedies applied. It is the foreman's job to learn what is causing costly accidents, he pointed out.

$4 Million for Research

FOOD manufacturers will spend $3,886,000 for research this year, according to Robert I. Lund, Chairman of the National Association of Manufacturers' Committee on Patents and Research. This amount, however, represents only 0.2 percent of the gross sales of the industry, as compared to a research expenditure of 3 percent for the machinery industry. The total research expenditures for all industries will amount to $117,490,000.



"It's marked perishable, and I think it did!"

Production of Peanut, Soya Flours Expanded

AS PART of the program to feed Britain, Surplus Marketing Administration is buying vast tonnages of peanuts and soybeans. Much of this is being made into full fat flour by domestic processors. The magnitude of this program is readily apparent from the expected 50,000-ton production of these products this year, compared with some 1,500 tons last year. Much new equipment has been necessary and new technics are being developed.

In Clarification

ATTENTION has been called to the fact that a news item in the June issue of FOOD INDUSTRIES gave some the erroneous impression that break-up of American Lecithin Co. would be required as a result of the order issued by the FTC pursuant to a complaint filed against that company. The fact is, according to Joseph Eichberg, president of the company, that the concern is cheerfully complying with the FTC order in all respects. Licenses for a royalty are freely offered by American Lecithin Co. under its use patents to all manufacturers regardless of the source of the lecithin or any other material employed in practicing the inventions.

Facts about Fats Told by Chemists

New sources of vegetable oils. Antioxidant keeps lard longer. Vitamin A losses in baking

UNUSED sources of vegetable oils which might have future commercial value were cited by E. B. Kester, Western Regional Research Laboratory, Albany, Calif., in a paper read before the fall meeting of American Oil Chemists' Society at Chicago, October 8-11.

These lesser known and little used vegetable oils are at present largely waste products of crops grown on a large scale. They fall under the three classifications: (1) Pit, (2) seed and (3) seed-covering oils. An estimated total of these oils for possible industrial uses is somewhere between 14,000 and 15,000 tons per year. They occur in: (1) Walnuts and the pits of apricot, prune, peach and cherries; (2) tomato, citrus fruit, grape and raisin, apple, sunflower, squash and pumpkin seeds; and (3) rice bran and olive and avocado meats.

Capt. R. H. MacDonnell, Quartermaster Corps, discussed the various Army rations and stressed the need for shortening in the biscuit compounds which can stand a temperature range from minus 20 deg. to 135 deg. F.

Of more than passing interest was a paper by W. G. McLeod, Oscar Mayer & Co., Madison, Wis., on the use of southern sweet gum as an antioxidant in lard. As little as 0.05 percent in prime steam kettle lard more than doubles the keeping time of the lard.

H. C. Black, *et al*, Swift & Co. Research Laboratories, reported on the loss of vitamin A content of fats during baking. Bread containing 6 percent fat showed loss of 8 to 26 percent of fat vitamin A content; cake containing 13.7

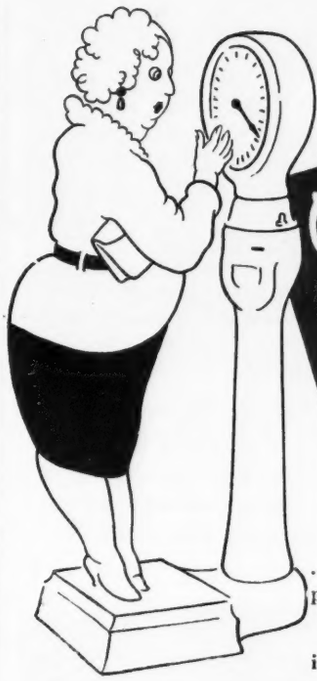
SCHEDULE OF EVENTS

NOVEMBER

3– 5—American Institute of Chemical Engineers, annual meeting. The Cavalier, Virginia Beach, Va.
5– 7—Associated Grocery Manufacturers of America, Waldorf Hotel, New York.
10–12—National Cooperative Milk Producers Federation, Congress Hotel, Chicago.
10–14—American Bottlers of Carbonated Beverages, Municipal Auditorium, Philadelphia, Pa.
12–13—National Cooperative Milk Distributors, Inc., Binghamton, N. Y.

DECEMBER

1– 6—Exposition of Chemical Industries, Grand Central Palace, New York.
3—National Dairy Council, annual meeting, Palmer House, Chicago.
4– 5—Tri-State Packers Association, annual meeting, location to be announced.



Reducing Problems

Cutting down is no easy task—the lady at the left will vouch for that. She hasn't succeeded because she's not following the proper plan.

Cost reducing in business works the same way . . . It doesn't succeed unless youu have the right set-up . . . and that's where modern machinery plays a vital part.

This is especially true of packaging machinery. For in packaging, almost all of the work is done by the machine. Therefore, if costs are to be reduced or savings effected, the machine must do it.

Our new machines are built for *cost reducing*—they save time and money, *first* by offering faster operating speeds; *second* by economizing on wrapping material; *third* by being more easily and quickly adjustable for different sizes; *fourth* by requiring less supervision and maintenance; and *fifth* by keeping the goods in better condition, and reducing "returns."

Today, with the growing scarcity of labor and the steadily mounting material costs and taxes, these savings prove extremely welcome.

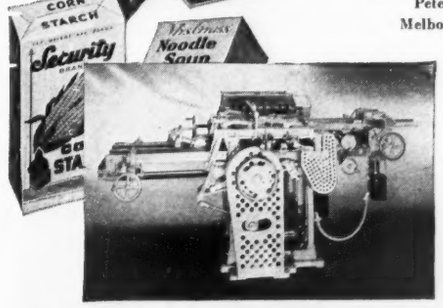
We have a line of over 70 different models of wrapping machines from which to fill your needs—and a Designing and Engineering Department that is ready to tackle any special problem.

●

Write us, telling the type of package you are using and describing briefly your present equipment. We will send you literature on machines suited to your needs and specific recommendations.

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts

New York Chicago Cleveland Los Angeles Toronto
Buenos Aires, Argentina: David H. Orton, Maipu, 231
Peterborough, England: Baker Perkins, Ltd.
Melbourne, Australia: Baker Perkins, Pty., Ltd.

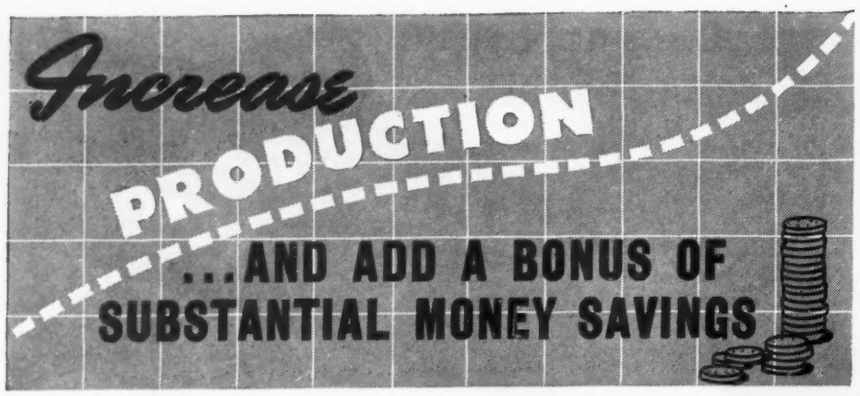


One of our widely used
"REDUCERS"

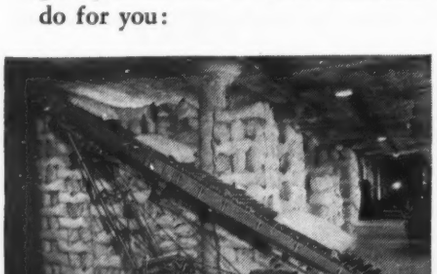
Model FA, illustrated, is quickly adjustable for a wide range of sizes and adaptatble to many types of products and styles of wrapping.

Literature on request

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines



Standard Conveyor engineers, through sound recommendations, based on more than thirty years of conveyor experience throughout industry, have helped hundreds of manufacturers to make man-power and man-hours more productive. Typical installations like those described below give you an idea of what Standard Conveyor engineers may be able to do for you:



PROMINENT FOOD MANUFACTURER REPORTS:

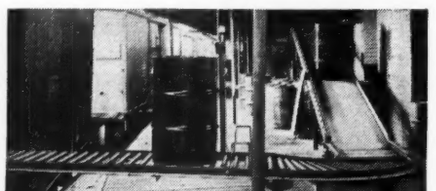
". . . one of the greatest time and labor-saving devices we have ever used—paid for itself in less than 12 months."

ARMAMENT PRODUCTION:

Standard Conveyors used in large plant for fast, safe "line" production of 3 inch A. A. shell.

OIL REFINERY SAVES FIRST INVESTMENT

in Conveyors—$6,501 a Year. ". . . new equipment must justify itself within first year . . . the conveyor has paid for itself within that time. Additional conveyors have been purchased each year since first conveyors were installed."



Booklet Shows Conveyor Applications and Possibilities

Send for booklet FI-11—"Conveyors by Standard"—a valuable reference book on conveying and conveying methods—contains many installation pictures representing practically all industries—suggests type of conveyors best suited to particular products and commodities.

CONVEYORS by Standard
STANDARD CONVEYOR COMPANY
General Offices: North St. Paul, Minn.
Sales and Engineering Offices in Principal Cities
"THE STANDARD OF VALUE"
Standard CONVEYORS
FIRST FOR FASTER PRODUCTION

percent fat showed no vitamin A loss; biscuits containing 14 percent fat showed no loss; pie crust containing 37.4 percent fat showed 89 to 75 percent loss; and French pastry containing 47 percent fat showed a 79 percent loss of vitamin A content. These results are being checked by biological assays.

Rigid Restrictions Placed on Use of Cork

COMPANIES supplying cork, and products in which cork is used, have been ordered to set aside their entire stock of cork and all finished and semi-finished products and materials of which cork is a component, as a reserve, for filling defense orders and other orders authorized by the Director of Priorities. This order became effective October 1.

Under the order, no deliveries or withdrawals shall be made from the reserve either for customers or for purposes of manufacture except under specific directions issued by the Director of Priorities. And each month directions covering deliveries and amount of materials to be processed will be issued.

The order further specifies that no insulation board other than that for defense orders, or for the preservation of food, shall be delivered except under the express direction of the Director of Priorities.

Furthermore, finished crowns may not be delivered to any customer except for deliveries during each month in such quantities as necessary to meet the customer's production of crowned bottled goods for the next succeeding month, after normal use has been made of the customer's inventory.

Food Standards Quiet

BECAUSE of the postponement of the macaroni standards hearing from October 6 to November 3, the month of October represented a very quiet one as far as outward indications of progress on food standards. As anticipated, the Federal Security Administrator revised the findings of fact in the dried skim milk order so that the standard explicitly would "promote honesty and fair dealing in the interest of customers." This amendment appeared in the *Federal Register* of September 30.

More Expansion Due In Food Processing

PLANS put forward by the United States Department of Agriculture (see FOOD INDUSTRIES, October, 1941, page 73) look to something like a 15 percent overall increase in 1942 for all agricultural

food products. This is for two purposes: for lease-lend shipments of food to Great Britain and her allies; and for the creation of a stock pile of food in this country, available for feeding the victims of German aggression after hostilities cease.

Both of these purposes demand processing and preservation of food, as raw, unprocessed foods can neither be

CAPITAL VIEWS

COMMANDEERING—The President now has the power to authorize seizure of property under many conditions. This power will be exercised, but probably only under two circumstances. Where excessive stocks have been built up and a short-sighted owner of these scarce materials does not choose to sell, he may be compelled to do so. In other cases, seizures of even normal stocks will be drastic when this is necessary for punitive purposes to secure general compliance with emergency orders.

NO POLLUTION LAW—There are five bills pending in Congress proposing to establish a stream-pollution control division in the Public Health Service. None of these is likely to pass. The Budget Bureau, speaking for the President, has said that the Administration does not wish any of this legislation at this time. But this does not imply that needless stream pollution will go unpunished. It merely means that state or local action, not Federal restriction, will be used as the governing agency. Later, Uncle Sam will also take a hand, and very comprehensively.

LABORATORY PRIORITY—Any food plant laboratory which needs aid to get small quantities of reagents, apparatus or materials will probably be helped. Applications should be made to the chemical branch of OPM. Any reasonable effort to maintain close quality control in food plants is regarded as so important as to command a high priority, usually A-2. But evasions of restriction on use of scarce materials through subterfuge that they are needed for the laboratory will be a very dangerous practice.

WAR DECLARATION—Whether it is wise to declare war now or later is a common subject of argument in Washington. Whether we shall ultimately declare war or have war declared on us by the acts of the Axis is no longer a debatable question in the Capital. We shall.

PRICE CONTROL BY TAXES—Some form of price-control measure will pass this winter. Probably more effective is the government's intention to take out of the general public income some $10 or $15 billion by one method or another. Some of this will be taken through increased social securrity taxes, some by almost forced savings, and many other new forms of levy are being considered. Official economists wish that they could take at least $20 billion in this fashion promptly. Their purpose is twofold: It gives Uncle Sam cash; and it reduced the buying power and, therefore, slows down the upward spiral of prices. It is also argued that this compulsory saving through taxes will be a buffer against the post-emergency collapse when many millions of people will be out of a job or compelled to find their way back into their old types of employment.

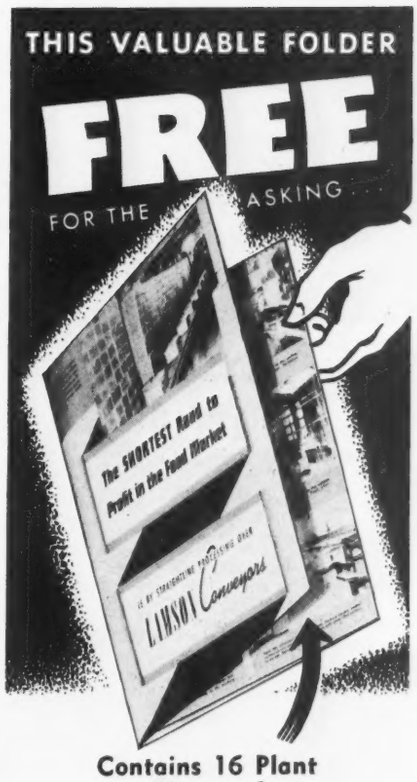
FEWER FOOD CONTAINERS—The Department of Commerce thinks that glass containers ought to be fewer in number and style. Glass Container Association has been so told bluntly by the Department of Commerce. "A sensible and timely reduction in bottle sizes, shapes and capacity is good management and would be a contribution to the defense effort." It remains the job of the food industry to find out whether the elimination of styles and distinctive patterns which have definite trade value will have negligible benefit or economy in labor and material, or otherwise. It may be hard to prove this to some of the government officials, even if true.

FLOOR STOCKS TAX—Those who built up in the distribution system unusual stocks of goods in anticipation of the tax law are finding that their taxes are just as big and their job of reporting much bigger than it would have been had they waited until after the law was passed.

CADMIUM POISONING—The food industries are being warned that the use of cadmium plating may be dangerous. F&DA thinks that it has found some important cases where this coating of household refrigerator trays and cooking utensils caused dangerous results on food. Industrial processors are urged to avoid any chance of such contamination.

SPAB ACTS—One of the most drastic official actions ever taken by this government is the order of SPAB restricting the use of copper. This is more than a priority or an allocation plan. It actually includes prohibition against the use of copper for many designated purposes after certain indicated dates. This is one of the first, but not the only, case showing that the war economy is going to completely upset much of American manufacture.

LEND-LEASE FOOD—Washington believes that within the next 12 months food sent abroad under the Lend-Lease program alone will have a value in excess of $1.5 billion. Since this huge spending will be concentrated on relatively few foods, it shows how completely the market may be stripped of certain normal items.



Contains 16 Plant Photos of "THE SHORTEST ROAD TO PROFIT IN THE FOOD MARKET"

Yes, there is a "short road to profit" in the food market. It's the straight-line road set by Lamson Food Package Conveyors in scores of famous plants all over America.

Wait—get the facts before you decide! And be fair to yourself. Just examine the 16 plant photographs contained in this folder . . . photographs taken in plants you know and respect. And examine the blueprint plan showing the basic Lamson principle of stockroom movement and control.

It's all in this valuable folder . . . all explained so simply and clearly that you'll understand it in a flash . . . and all detailed so simply that you'll realize how amazingly inexpensive Lamson Food Package Conveyors are to install and operate. Don't wait. Send the coupon now.

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FOOD PACKAGE CONVEYORS

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Without cost or obligation, please send by return mail a free copy of your latest pamphlet, "The Shortest Road to Profit in the Food Market."

Name..... Title.....
Company .....
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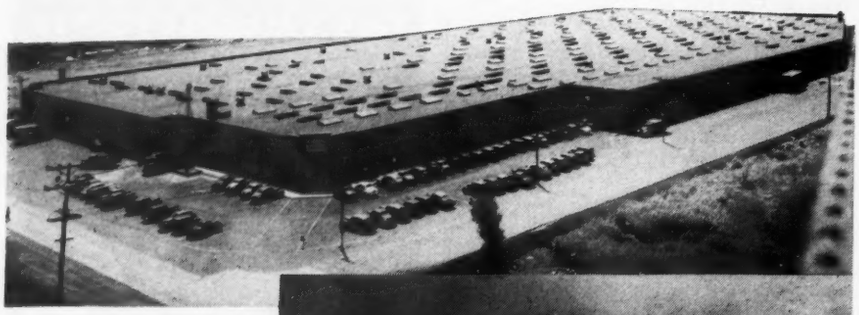


ABOVE: ***Spacious plant*** of American Stores Inc. at Kearny, N. J.

RIGHT: ***Meat Storage:*** 30 carloads of meat can be stored in this room in the plant of American Stores Inc. Adjoining freezer holds 5 carloads. Walls, ceilings and floors of both rooms are insulated with Mundet Corkboard.

LEFT: ***Fruit Storage:*** Partial view of one of American Stores' cold storage rooms, insulated with Mundet Corkboard. Produce, eggs, butter and lard are kept in other rooms, where temperature control is maintained with the help of Mundet Cork Insulation.

Protecting Perishables

To protect the freshness and quality of a wide variety of food products, American Stores Inc. required dependable, highly efficient cold insulation. That is why Mundet Corkboard was selected for the insulation of all low temperature rooms in their modern warehouse, at Kearny, N. J. Mundet Cork Corporation, Insulation Division, 65 S. Eleventh St., Brooklyn, N. Y.

MUNDET
CORK INSULATION

CONSERVES LOW TEMPERATURE

CONSTRUCTION NEWS

	Pending (thousands)	Awarded October (thousands)	Total Awarded 1941 (thousands)
Bakery	$40	$40	$3,930
Beverages	407	367	7,651
Canning and Preserving	80	.....	525
Cold Storage Plants	110	45	780
Confectionery	95	75	318
Grain Mill Products	.....	195	6,465
Ice Manufactured	.....	75	310
Meats and Meat-Products	390	800	2,138
Milk Products	660	40	2,397
Miscellaneous	655	1,222	5,757
	$2,437	$2,859	$30,271

shipped or stored. Therefore, American food manufacturers are faced with the necessity for rapidly increasing their output of processed foods.

Of course, there will be no horizontal increase of 15 percent. Some foods, as dried eggs and dried milk, are already undergoing tremendous increases, many, many times 15 percent. Others will be increased but slightly, if at all.

Nevertheless, the impact of these increases will be felt throughout the food industries. For some years to come, there is likely to be a trend toward increased output and increased sales, accompanied by a tight raw material supply situation, difficulty in obtaining processing supplies and equipment, and higher prices all around.

Commodity Rise Slows

OVER-BUYING by speculators, news from the war fronts, and nearing of government action against runaway prices, all combined to slow down the rise in food commodity prices during the period from mid-September to mid-October. The *N. Y. Journal of Commerce*'s weekly index of general commodity prices, at 95.1 on September 20, stood at 95.8 on October 18. For the same period, this publication's grain price index fell from 84.2 to 80.9, while its food price index rose from 90.7 to 91.3.

This hesitation in commodity prices was in contrast to increasing business activity. For the four weeks from September 13 to October 11, the *Business Week* index of business activity rose from 154.5 to 157.6.

Spot prices showed some losses and some gains during the period from September 20 to October 18. Wheat, No. 2 dark winter, Kansas City, fell from $1.10¼ to $1.08, and flour dropped from $6.50 to $6.35. Corn, No. 3 yellow, Chicago, fell from 74¢ to 66¢. Among the meats, beef rose from 17½¢ to 18¢, lamb was unchanged at 19¢, as were

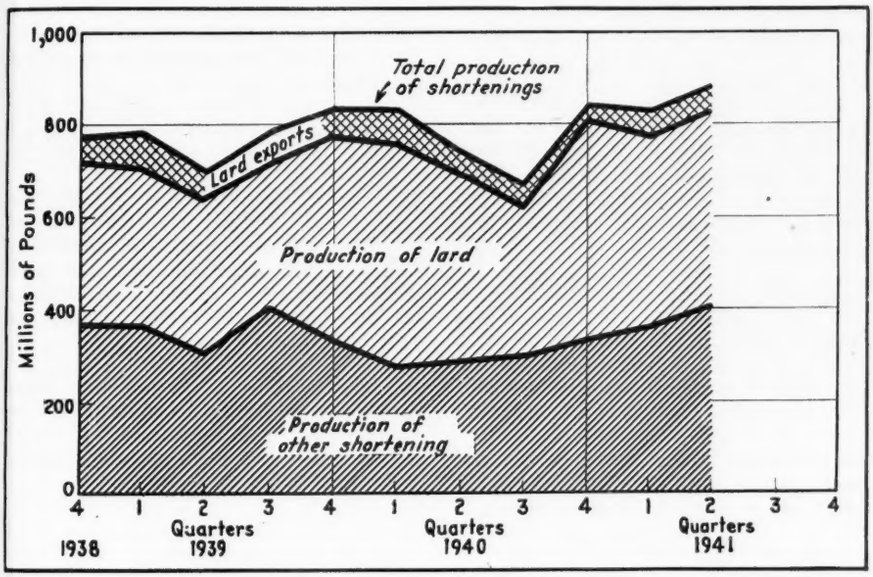
pork loins at 23¢. Lard fell from $11.10 to $10.20. Eggs rose from 29½¢ to 32¢, while butter fell from 36½¢ to 34¼¢ and cheese rose from 25¼¢ to 25½¢. Imported foods such as cocoa, sugar and coffee showed little change. Among the canned foods, tomatoes upped from 77½¢ to 82½¢ and salmon went from $3.35 to $3.50.

Oils and Fats Supplies Expected To Be Short

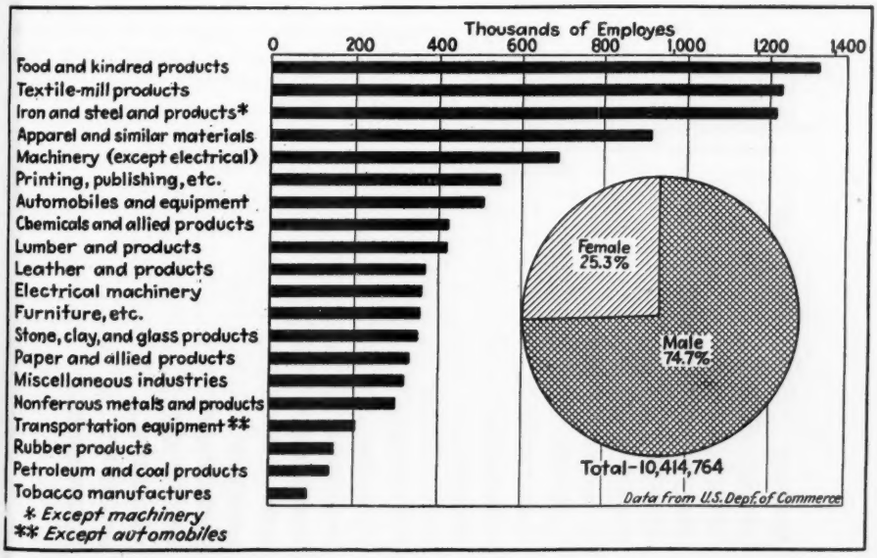
IN CONTRAST to earlier expectations, supplies of oils and fats in the United States in 1941–1942, for domestic consumption and export, may be short. Cottonseed oil and peanut oil are expected to be curtailed this year; and imports of oils and oil-bearing materials, particularly olive oil and copra, have been running below former years. Concurrently, apparent domestic consumption of oils and fats has increased by about 20 percent, while exports have maintained the level of the preceding year.

Therefore, in spite of increased production of lard and soybean oil, demand is expected to be somewhat greater than supply, resulting in greatly increased prices unless a government price ceiling is set.

This situation should not, however, continue into the 1942–1943 year unless importations are greatly curbed. Production goals set by the Department of Agriculture look to expansion of soybean acreage for beans by 1,100,000 acres and of peanuts by 1,600,000 acres. In addition, hog production, and hence lard output, is expected to increase.

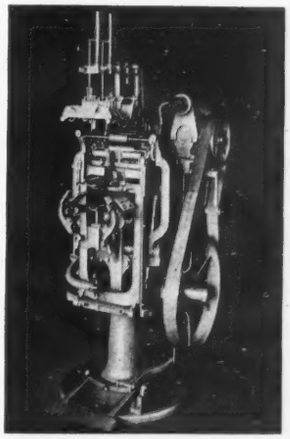


Production of lard and other shortenings, and lard exports, by quarters (1939-1941), as reported by the Bureau of the Census. Note that exports of shortenings other than lard are negligible.



Employment in manufacturing establishments in 1939, showing that food processing employs more people than any other manufacturing group.

Look Into the



WORLD Model S
Semi-Automatic Labeler

Here's World's most versatile Labeler—The WORLD Model S Semi-Automatic. It labels any size bottle from vials to gallons. It applies front or back labels or labels that go all around a jar or bottle. It applies body, neck labels—foil, too—in one operation if desired.

Write for Bulletin S-8 giving the whole story on this dependable, easy-to-operate, economical WORLD Labeler. If you care to send us samples of your labeled containers we'll give you complete performance and cost estimates.

ECONOMIC MACHINERY CO.
WORCESTER, MASSACHUSETTS

INDICATORS

FLOUR PRODUCTION in September, 1941, by mills accounting for 65 percent of United States flour production, according to *The Northwestern Miller*, totaled 6,178,777 bbl. compared to 6,037,290 bbl. in September, 1940.

SALMON CANNED in Alaska this year is now estimated at 6,781,741 cases, a larger pack than in either of the two preceeding years. The pack of Alaska pink salmon, at 4,633,056 cases, was the highest recorded, comparing to 2,912,551 cases last year.

CORN PACK this year is expected to exceed 26,000,000 cases, a record and comparing to other high years of 23,541,224 cases in 1937 and 24,820,000 cases in 1925.

KRAUT CABBAGE PRODUCTION this year is estimated at about 180,800 tons, compared to 185,200 tons last year and to a ten-year average of 155,000 tons.

GREEN LIMA BEAN PRODUCTION for canning and freezing this year is expected to reach 36,140 tons compared to 26,140 tons in 1941 and to a 1930-1939 average of 18,190 tons.

BEETS for canning are expected to reach the record figure of 109,200 tons this year, compared to 70,700 tons in 1940 and to a 1930-1939 average of 44,500 tons.

TOMATO PRODUCTION for processing is expected to be 2,563,500 tons, compared to 2,274,700 tons in 1940 and to a 1930-1939 average of 1,579,600 tons.

GREEN PEAS packed in 1941 made a new record of 28,894,607 actual cases, compared to 25,460,290 cases in 1940.

GRAPEFRUIT PRODUCTION for the 1941-1942 season is now estimated at 40,233,000 boxes, compared to production of 42,974,000 boxes in 1940-1942 and to 35,175,000 boxes in 1939-1940.

EVAPORATED MILK PRODUCTION in August, 1941, reached 293,359,000 lb. of case goods, 27 percent more than in August, 1940, and 66 percent over the 1935-1939 average for August. Production, first eight months of 1941 was 2,081,180,000 lb., 14 percent above production for the like period last year.

SWEETENED CONDENSED MILK produced in the first eight months of 1941 was 71,677,000 lb., 96 percent over production in the corresponding months of 1940 and 130 percent above the 1935-1939 average.

CREAMERY BUTTER PRODUCTION in August, 1941, totaled 171,280,000 lb., up from 165,427,000 lb. in August, 1940, and comparing to 154,312,000 lb., the 1930-1939 August average.

CREAMERY BUTTER PRODUCTION, first eight months of 1941, was 1,378,310,000 lb., compared to 1,296,741,000 lb. for a like period of 1940, and to 1,201,864,000 lb. average for the period in 1930-1939.

AMERICAN CHEDDAR CHEESE PRODUCTION in August, 1941, was 68,465,000 lb., 18 per cent over production in August, 1940, and 53 percent over the average 1930-1939 August production.

AMERICAN CHEDDAR CHEESE PRODUCTION, first eight months of 1941, was 474,025,000 lb., compared to 418,733,000 lb. in the first eight months of 1940 and to 325,484,000 lb. average for the period in 1930-1939.

CHEESE PRODUCED in January to August, 1941, inclusive, all kinds except skim milk, cottage, pot and bakers, totaled 611,700,000 lb., compared to 549,350,000 lb. in the same period of 1940.

OLEOMARGARINE SALES in August, 1941, as indicated by sales of internal revenue stamps, amounted to 23,255,084 lb., compared to 21,224,706 lb. in August, 1940. For the January-August period of 1941, oleomargarine sales totaled 234,603,942 lb., compared to 201,210,964 lb. in the corresponding period of 1940.

CORN PRODUCTION in the United States in 1941 was estimated in the October crop report at 2,625,502,000 bu., up 100,000,000 bu. over the September estimate and comparing to an actual crop of 2,449,200,000 bu. in 1940.

COLD STORAGE SPACE in warehouses and meat packing plants grossed 764,646,000 cu. ft. as of June 16, 1941, according to the U. S. Department of Agriculture, an increase of 18,200,000 cu. ft. since the 1939 survey.

FRUITS, frozen, in storage on October 1, 1941, totaled 210,262,000 lb., compared to 162,794,000 lb. on October 1, 1940, and to an average of 132,780,000 lb. for the date in 1936-1940.

VEGETABLES, frozen, in storage on October 1, 1941, were 97,369,000 lb., compared to 82,278,000 lb. a year before.

BUTTER, creamery, in storage on October 1 of this year amounted to 202,670,000 lb., compared to 128,087,000 lb. on October 1, 1940, and to 144,183,000 lb. as an average for October 1 in 1936-1940.

CHEESE, all kinds, in cold storage on October 1, 1941, totaled 188,400,000 lb., compared to 150,211,000 lb. a year earlier and to an average in 1936-1940 of 128,203,000 lb. for the date.

EGGS, case equivalent, in storage on October 1 of this year equaled 10,516,000 cases. The corresponding figure last year was 9,777,000 cases and the average in 1936-1940 was 9,293,000 cases for the date.

POULTRY, all kinds, in frozen storage on October 1, 1941, totaled 96,413,000 lb., compared to 90,842,000 lb. on October 1, 1940, and to an October 1 average of 71,553,000 lb. in 1936-1940.

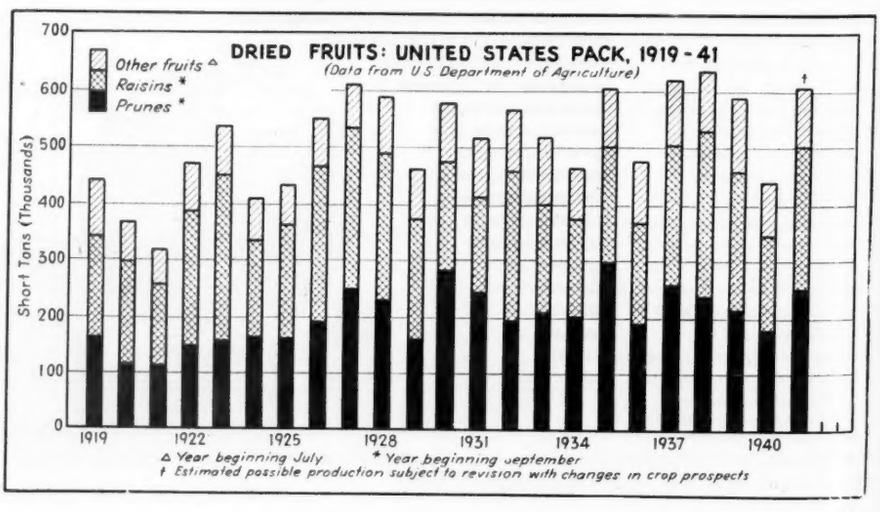
MEAT, all kinds, in cure and frozen storage on October 1, 1941, was 507,131,000 lb. The figure for October 1, 1940, was 426,485,000 lb. and the average figure for October 1, 1936-1940 was 417,061,000 lb.

LARD IN STORAGE, October 1, 1941, was 215,570,000 lb., and rendered pork fat on the same date totaled 3,646,000 lb. The combined figure for these two products on October 1, 1940, was 235,690,000 lb., and the 1936-1940 average was 115,768,000 lb. for the date.

WEEKLY WHOLESALE FOOD PRICE INDEX of Dun & Bradstreet stood at $3.26 on October 21, 1941, compared to $3.33 on September 18, 1941, and to $2.33 for the comparable 1940 week.

BUSINESS ACTIVITY INDEX of *Business Week* stood at 157.6 on October 11, 1941, compared to a figure of 154.5 one month before and to 134.4 for the corresponding date last year.

COST OF LIVING INDEX of National Industrial Conference Board was at 90.8 in September, 1941, compared to a figure of 89.4 in August, and 6 percent higher than in September a year ago.



△ Year beginning July * Year beginning September

LETTERS TO THE EDITOR

Food Prices Up? —Up From What?

To the Editor
of FOOD INDUSTRIES:

You are undoubtedly concerned, both in your writings and in your own home, with the matter of food prices. It is right that you should be, for the steady supply of nutritious food to all the people, together with the people's confidence in that supply of food, is one of the most important phases of our crisis today.

And it is for that reason that I write this letter. We have all, at one time or another, regretted the complexity of our life. It is seemingly impossible to get all the information on one matter together at one time, so that we can examine it logically and wholely. Too often, startling statements, heavy with importance because of their newness, outweigh more important facts that have become only half remembered, or were missed entirely.

I suspect this is true of each of the vast enterprises in our country. I'm sure it is true of the food industry. The happenings in our industry have long been public property. New developments . . . fresh ideas . . . stories of economies and progress appear every day. But seldom have I seen a round-up of these individual news events weighing each against the others at their true worth so that they present a complete fullsided picture. Usually, they lie like the pieces of a jigsaw puzzle.

So it is, we feel, that the matter of food costs is being misrepresented to the public. We in the food industry must protest strongly when responsible public officials state that food prices are up "as much as 24 percent."

The grocery manufacturers of America would be the last to deny that the prices of staple foods are rising. They are . . . but they are rising slowly and they are being forced by other powerful economic forces.

The Bureau of Labor Statistics in Washington has taken the period from 1935 to 1939 and arbitrarily decided that the average commodity prices for those years represent 100. On this basis, food prices for August 12, 1941—which are the latest available—are at 108.0. They are 8 percent above prices during the "depression thirties." A claim of price rises of 24 percent repudiates these authentic findings of the Bureau of Labor Statistics. It spreads rumors which may easily lead to hysteria on the part of 30,000,000 housewives in America. And such hysteria could well lead to hoarding, price-spiralling and, possibly, inflation.

The facts are these: Three principal factors are at work gradually forcing the price of food up. They are government spending, higher cost of production and subsidized and greatly increased farm prices. I advance them not in condemnation, but in explanation.

Government spending for the Army, the Navy, stockpiles and export under Lend-Lease has created a great new demand for food. Under normal conditions, such an increase would have the effect of moving prices upward. However, at the same time, the weekly earnings of labor engaged in manufacturing industries has increased 27 percent, thus adding to the cost of food processing and distribution. Finally, but by no means least important, the prices paid to farmers for farm products have increased 51 percent since 1939.

If these increases have not been passed to the public, it is because the manufacturers and distributors of foods have been doing an efficient and economic job, particularly during the past ten years. In that period, they have reduced their cost of distribution by 18 percent. And it was a saving fortunate to the public, and to the food industry.

When the public officials warn alarmingly that food prices are up tremendously, one must in fairness demand:

"Up from what?"

Prices today are 19 percent below those of 1929—so they cannot possibly mean up from 1929.

In 1937, according to the Bureau of Labor Statistics, food prices moved to 108.02. Now they are 108.0. They can hardly mean 1937.

There are other facts about the price of foods that must, in all fairness, accompany any price statements that are made. The average factory worker in 1929 had to spend about one-third of his income on a standard food budget. This year, he has had to spend but one-fourth. His "real" income—the actual purchasing power of his dollar—is one-third greater than it was a year ago. But his total cost of living has advanced only one-twelfth over last year.

These are interesting figures, and they are vital ones. They do not refer to any single man or to any single dollar, but to the whole of them. And it is just as necessary now for the man on the street to look at the whole picture as it is for the manufacturer, whose examination of America's needs has caused him to turn his plant from consumer to defense building at the loss of hard-won consumer acceptance, or in the event his materials were needed elsewhere, close his plant altogether.

Those who utter scare-head plaints about food prices have these figures as available as we do. Not to refer to them indicates that the food industry is to be made the new whipping boy.

We have no intention of submitting to this. Already the food industry is in the middle of a gigantic squeeze play, in which farm prices are being subsidized to new high levels on one side, and retail price ceilings and new taxes are being threatened on the other. We cannot stand both pressures at once.

From the standpoint of a balanced price structure, food prices are low. They have been since 1929 and, in fact, ever since the 1920-21 price collapse after World War I. Moreover, they are the best foods to be supplied any nation in history.

With the per capita income of wage earning groups restored to their 1929 levels and with food prices below those even of 1937, it seems an excellent idea to demand, when people speak of price rises in foods: *"Up from what?"*

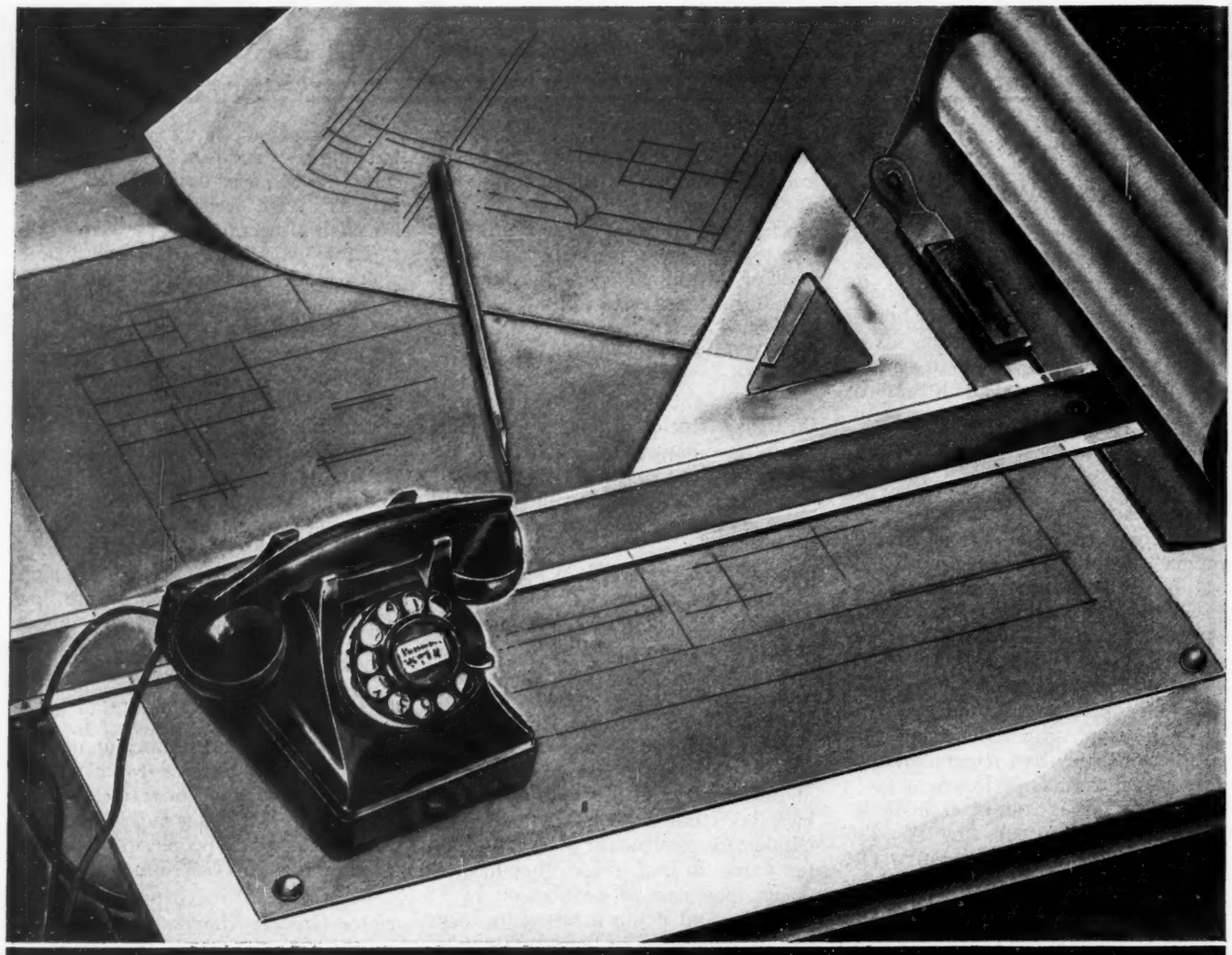
—PAUL S. WILLIS, *president, Associated Grocery Manufacturers of America, Inc., New York, N. Y.*

Vas You Dere, Frank?

To the Editor
of FOOD INDUSTRIES:

I hate to disagree with your editorial on page 37 of the October issue, but I doubt if British troops in the desert have changed from what they were in 1916-18. I vas dere, Sharlie—western desert slightly (*Wadi Natrun*) and eastern desert muchly (*Sinai*). Boy, how we liked iced beer and iced *John* Collins's ("John" is gin and ginger beer, and a damned good drink) when we got back to where ice was available. But when you are out in the desert and water is scarce—not over a gallon a day for all purposes (washing, shaving, cooking, drinking)—even warm beer tastes good. There is one improvement this war—it is American beer, apparently, instead of Asahi and other Japanese brands. Even those tasted good in the desert. Water we could cool by keeping it in unglazed earthenware jars, known to us as "chatties"—Hindustani word, I believe—but beer and other drinks would soon clog up their pores.

—FRANK L. SEYMOUR-JONES, *Borden Co., New York, N. Y.*



AN EARLY CALL...*may solve your insulation problem!*

THERE is no minimizing the fact that a "cork situation" exists. All of America's cork supply comes from war zones where shipping is uncertain. Available supplies are further limited because since June, Uncle Sam has been building up a stock pile of cork to assure an adequate reserve for defense needs.

Under the circumstances "Insulation business as usual" does not apply to corkboard. Defense needs come first and remaining supplies must be utilized as advantageously as possible. Temporarily, corkboard is not available for roof insulation and for some other uses not concerned with the preservation of perishable food products. But even on work in the perishable food field we have had to ask many old customers and friends to put up with delays and restrictions.

We know these delays can be costly and we are doing everything in our power to reduce them. But our efforts alone are not enough. We need your help too.

You can give us this help by letting us know *early* of your insulation needs. As soon as you begin to think about any insulated construction, protect yourself—pick up your telephone and call us.

Discuss your plans with our insulation specialist—while, or even before, drawings are prepared. He'll have time to offer suggestions which may avoid delays or costly changes later on . . . time to work out your problem in the most effective way. Working together, we will be able to either supply your cork insulation needs promptly, or help to solve your problem with engineering assistance or with suitable substitute materials.

CORK COVERING

Armstrong's Cork Covering is used largely in defense plants or in plants requiring refrigeration to protect perishable foodstuffs. Due to this fact and because the relatively small amount of cork used has not hindered the Government's cork reserve program we can meet most needs for cork covering.

Can we help you now? If so, please call our nearest office or distributor, or write Armstrong Cork Company, Building Materials Div., 916 Concord St. Lancaster, Pennsylvania.

ARMSTRONG CORK COMPANY
Insulation Headquarters

★ CORKBOARD ★ CORK COVERING ★ FIBERGLAS* ★ TEMLOK ★ INSULATING FIRE BRICK ★

*Reg. U. S. Pat. Off. O.-C. F. Corp.

MEN · JOBS · COMPANIES

INDUSTRY

Alphin Ice & Cold Storage Co., El Dorado, Ark., is planning to build a $75,000 ice and refrigerating plant, with D. P. Troxel as manager. It will include rental lockers for frozen fruits, vegetables and meat and a meat curing plant with an annual capacity of 1,000,000 lb.

Armour & Co. on Oct. 10 suffered loss of $15,000 to its Birmingham, Ala., plant in a fire which burned the hide storage plant, feed bins, barreling plant, cattle ramps and box factory.

Bishop Milling Co., Bishop, Tex., lost a big feed mill valued at $40,000 to $50,000 in a fire of undetermined origin which swept the plant on Oct. 9. About half of the loss was covered by insurance.

Bismarck Brewing Co., Chicago, Ill., has purchased for $300,000 the assets of Prima Brewing Co. of that city, to form Prima-Bismarck Brewing Co. The Prima plant has been closed and all activities are now carried on from the Bismarck plant, with Wilbur C. Smith continuing as president.

W. R. Carpenter, Ltd., a Dominion corporation, has recently put into operation a $300,000 copra plant in Vancouver, and plans to build another $150,000 plant immediately to increase capacity to five times the original plan.

Henningsen Bros., Inc., New York, is constructing a new egg-drying plant in Seamour, Ind., and three plants in Texas.

Houston Gin and Warehouse Co. has completed construction of a peanut warehouse with a 4,500-ton capacity at Sylvester, Ga.

Industrial Soya Co., a new firm of Toledo, Ohio, has taken over a plant from Larrowe Milling Co. of that city to begin operations as Toledo's second soybean plant. The plant includes two steel storage tanks with a capacity for 240,000 bu. of soybeans and two large buildings.

Jerpe Commission Co., Omaha, Neb., is building a $50,000 addition to its plant in that city.

Krey Packing Co., St. Louis, Mo., has awarded contract for reconstruction and improvements to various buildings of its meat packing plant, at an estimated cost of $150,000.

N. E. Miller Honey Co.'s plant in Delta, Utah, was recently destroyed by fire caused by defective wiring. Three hundred 5-gal. cans of honey, 1,000 new cans and 2,000 hives were lost in the $15,000 fire.

Nutritional Research Associates, carotene firm of South Whitley, Ind., has for the second time within three years quadrupled its productive capacity by the construction of extensive additions to its plant and installation of new equipment. Completion of the present expansion program multiplies the original capacity by sixteen.

Pet Milk Co., St. Louis, Mo., plans to erect an evaporated milk plant costing $500,000 in Siloam Springs, Ark.

ROY C. NEWTON

Swift & Co., Chicago, has elected him a vice-president, to continue in his capacity as head of the research division. Other new appointees to vice-presidency are Porter M. Jarvis, Eugene A. Moss and Charles T. Prindeville.

Purpura Bros., Inc., Ocala, Fla., has begun operation of its new, fully equipped citrus packing house, and has started work on a unit of the company's orange and grapefruit juice canning plant, to be completed by December. Cost of the plant is $100,000.

Southern Frozen Foods, Atlanta, Ga., will let contract for a $42,000 locker plant, to contain 700 individual lockers, and space in which to freeze and package vegetables, fruit and seafoods.

Standard Brands, Inc., is building a $300,000 plant at Peekskill, N. Y., for the manufacture of various types of yeast products such as yeast bouillon, dried yeast and dried-yeast extract.

Superior Popcorn Co., Des Moines, Ia., plans to construct a popcorn processing plant and storage building in Waukee, Ia., at a cost of $40,000 with equipment.

CHARLES F. KIESER

HARRY A. ROSS

Borden Co. has made C. F. Kieser and Harry A. Ross vice-presidents. Mr. Kieser, former manager of the dairy specialties division of Kraft Cheese Corp., has charge of the special products division of Borden. Mr. Ross, a member of the board of directors, will continue to supervise the company's research activities and will serve in a general executive capacity.

PERSONNEL

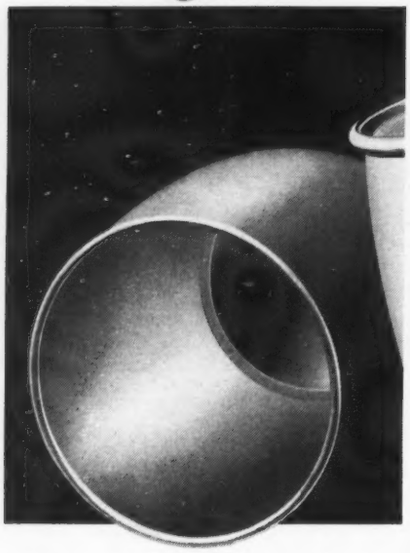
Jean E. Boyer, former oil refinery superintendent for American Maize-Products Co., at Roby, Ind., is now with Armour & Co. in its edible oil pilot plant.

R. H. Cardwell, Jr., general manager of G. W. Antrim & Sons, Richmond, Va., has been elected to the board of directors of National Coffee Association.

Harold W. Davie, formerly vice-presi-

Hackney
MILWAUKEE

Seamless Barrels



EXTRA STRENGTH AND EASIER CLEANING ASSURE YOU ADEQUATE PROTECTION AND LOW-COST HANDLING

Hackney Removable Head Bilged Barrels provide full protection to their contents—assure easy and rapid handling as well.

It's the bilged shape of this Hackney container that facilitates handling, makes possible economies every step of the way. And these economies are repeated year after year. Hackney Removable Head Barrels last longer. They are more resistant to hard knocks and transportation abuse, because they've been constructed by the Hackney process of cold drawing.

The smooth, seamless interior enables faster, easier and more thorough cleaning. The Toggle-tite (or single bolt) closure securely holds the head air-tight to the top edge, preventing leakage or the entrance of foreign matter.

There's a Hackney returnable barrel or drum to meet your requirement, exactly and economically. Write today for full information.

Observe the smooth curvature of the chime. There are no crevices, double seamed or welded joints in the interior of the barrel, making it exceptionally easy to clean.

PRESSED STEEL TANK COMPANY

1349 Vanderbilt Concourse Bldg., New York
208 So. LaSalle St., Room 1573, Chicago
669 Roosevelt Bldg., Los Angeles
1457 So. 66th St., Milwaukee

Containers for Gases, Liquids and Solids

dent of Prudence Foods, Inc., has been elected vice-president of Martin L. Hall Co., Boston, Mass., coffee packers.

Charles A. Eckburg, former president of Lakeshire-Marty Cheese Co., Plymouth, Wis., has been named president of Borden Cheese Co., newly created division of Borden Co. Vice-presidents are Will A. Foster and W. E. Wurtz.

William B. Esselen, Jr., formerly with the packaging research division of Owens-Illinois Glass Co., has accepted a position as assistant research professor in food technology at Massachusetts State College.

F. E. Hanington has been announced president, and J. R. Braden vice-president, of Pratt-Low Preserving Co., Santa Clara, Calif., following reorganization.

French Jenkins, formerly vice-president, has become president of La Choy Food Products, Inc., Detroit, succeeding Lee A. White, now chairman of the board. Jenkins will continue as general manager.

H. F. Judkins, Sealtest, Inc., New York, has been elected president of American Dairy Science Association. Vice-president is H. P. Davis, University of Nebraska, Lincoln, Neb.

Robert H. Lau was elected president of H. P. Lau & Co., food manufacturers and wholesalers at Lincoln, Neb., succeeding A. C. Lau who died recently.

I. C. Maghran, eastern manager of bulk product sales for Pillsbury Flour Mills Co., has moved his headquarters from Philadelphia to Buffalo, N. Y.

George W. Mechling, formerly general manager of the Lincoln (Neb.) Packing Co., has moved to Detroit to accept an executive position with Hygrade Food Products Corp.

ROGER BRANDENBURG

Mr. Brandenburg, Detroit, Mich., formerly production superintendent of Michigan Bakeries, Grand Rapids, Mich., and ex-president of the American Society of Bakery Engineers, has been appointed to the Quartermaster Corps as advisor on Army baking activities. Other bakery specialists who will advise the Army are Thomas Hennessey, Utica, N. Y., and Wilbur Cushman, Jackson Heights, N. Y.

James R. Nicholson, United Brewers Industrial Foundation, New York, has been placed in charge of the Foundation's self-regulation activities now operating in 14 states. He replaces T. Howard Kelly, resigned.

Alfred F. Pillsbury, John S. Pillsbury and Philip W. Pillsbury on Sept. 9 established the Pillsbury Institute of Flour Milling History with offices in Minneapolis, Minn.

H. H. Porter of National Biscuit Co., has been appointed manager of the company's chain store division.

Archie W. Roy, former office manager of the Omaha, Neb., branch of Fairmont Creamery Co., and since then manager of the Huron, S. D., branch, has been appointed manager in charge of plant operations at Omaha, a newly created position.

Alonzo E. Taylor, director of research since 1937, becomes special advisor on food science and economics to the management of General Mills, Inc.

Edward J. Vanderberg, Grand Rapids, Mich., has been appointed assistant manager of the Los Angeles plant of General Foods, Inc.

George B. Wagner, formerly with the Bureau of Entomology, U. S. Department of Agriculture, at Kansas State College, Manhattan, Kan., has become a member of the Millers National Federation technical staff with headquarters in Chicago.

E. C. Williams, former vice-president and research director of Shell Oil Development Co., has been elected vice-president of General Mills, Inc., and appointed director of research with headquarters at Minneapolis, Minn.

DEATHS

F. Reginald Arkell, vice-president and managing director of Kelly Douglas & Co., Ltd., food packers and manufacturers, Vancouver, B. C., recently in Vancouver.

Frank D. Bristley, 74, retired vice-president of Royal Baking Powder Co., Oct. 1, in New Smyrna Beach, Fla.

Thad G. Buckner, 53, president of Florida Coca-Cola Bottling Co., Oct. 13, in Jacksonville, Fla.

Edward Y. Crossmore, Sr., 58, retired executive vice-president of National Biscuit Co. and former president of National Bread Co., recently, in Cornwall-on-the-Hudson, N. Y.

Edward A. Cudahy, Sr., 81, founder of Cudahy Packing Co. and one of the

pioneers in the development of the American meat packing industry, Oct. 15, in Chicago.

Charles B. Hill, 69, vice-president and general manager of Northwestern Yeast Co., on Oct. 2, near Glencoe, Ill.

L. P. Kirkland, 55, first chairman of Florida Citrus Commission, Oct. 12, in Auburndale, Fla.

D. H. Steinburg, 50, manager of Stokely Bros. plants in Wisconsin and Minnesota, Oct. 7 near Milltown, Wis.

Robert Willkinson, 80, pioneer of the California citrus industry, Sept. 23, in Los Angeles. He was formerly president of the Semi-Tropical Fruit Exchange.

ASSOCIATED INDUSTRIES

American Can Co. is building a $2,000,000 manufacturing plant in St. Louis, to include a main factory, 1,035,621 ft., an office building, and a building with a cafeteria and machine shops.

American Society of Refrigerating Engineers has elected as president James W. Parker, vice-president and chief engineer of Detroit Edison Co.

Caterpillar Tractor Co., Peoria, Ill., has elected Louis B. Neumiller as president to succeed B. C. Heacock, now chairman of the executive committee.

Dow Chemical Co., Midland, Mich., is preparing to take over extensive holdings, including the wells and plant, of Morton Salt Co. in Ludington, Mich., for expansion of its national defense operations. The byproducts of the salt wells are needed in the manufacture of magnesia.

International Harvester Co. has completed two new 150-ton open-hearth furnaces to increase the steel ingot capacity of its Wisconsin Steel Works. In addition to the furnaces, a 220-ton crane, a charging machine and a two-hole soaking pit were constructed in the $1,500,000 program.

Layne & Bowler, Inc., Memphis, Tenn., has erected several new buildings to speed production. Latest is a fireproof, all-steel pipe and screen shop adding 8,000 sq. ft. of manufacturing space.

Owens-Illinois Glass Co., Toledo, Ohio, has awarded contract for a new plant at Waco, Tex., to be built with batch mixers and furnaces at one end, facing the line of bottle-making machines.

Package Machinery Co. will increase its trade and general media advertising appropriation for 1942 by 50 percent on the theory that business, despite being oversold in many cases at present, must prepare now for the postwar period.

A TWO-FISTED PILE DRIVER!

ONE MAN - *WITH A TOWMOTOR* - GETS RESULTS!

Give a man a few hours' instruction, put him in the seat of a Towmotor, and you've got a two-fisted pile driver who will move more materials per hour than will most 5 to 15 man crews on the payroll.

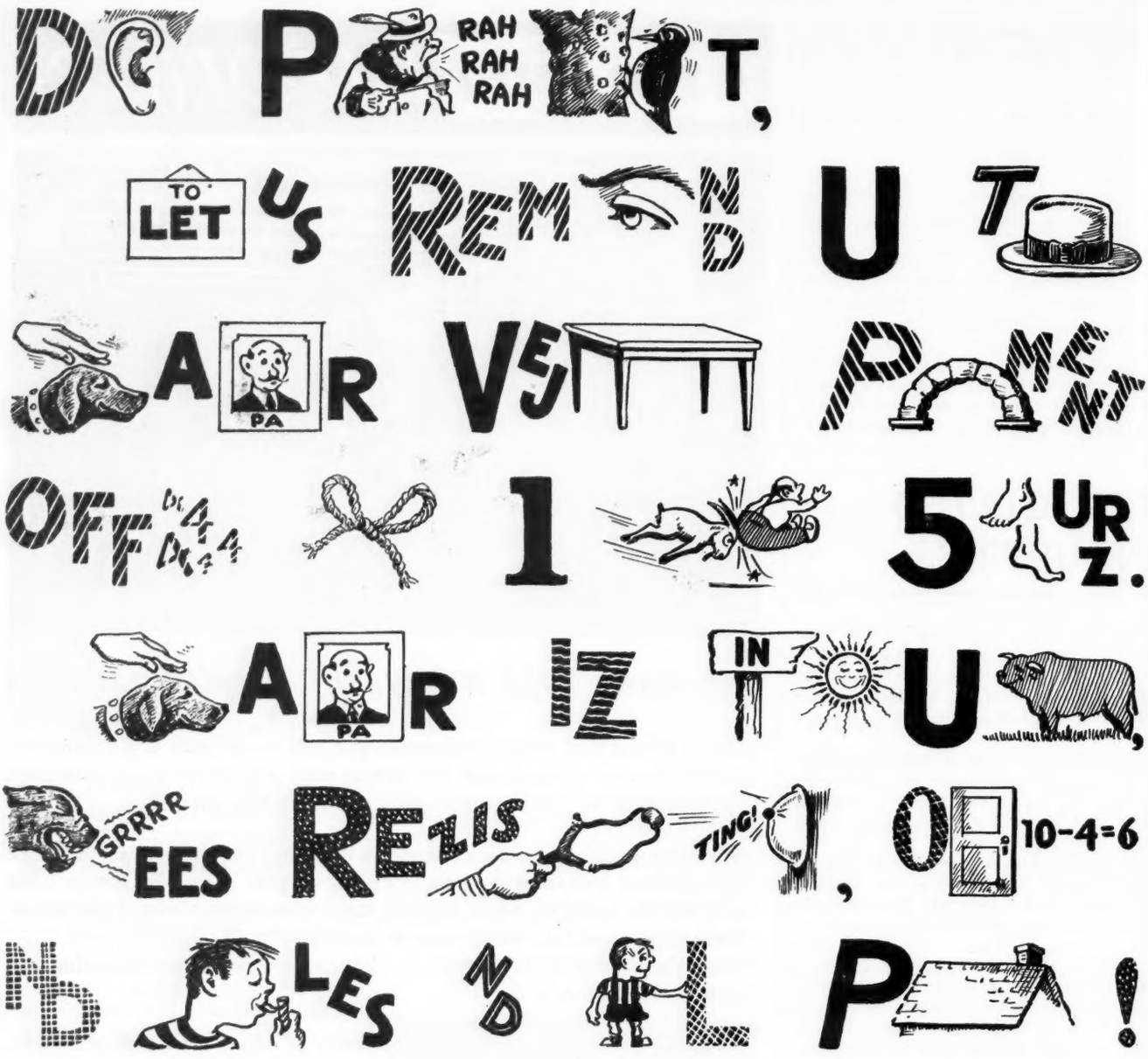
Towmotor multiplies a man's tonnage handling capacity, does the work of a gang at less than a hand trucker's wages. How? By lifting 1,000 to 10,000 lb. loads as *units*, moving them from carrier, along platforms, down ramps and into warehouse at speeds up to 10 miles per hour . . . piling them up to 25 feet high . . . and repeating or reversing this performance 24 hours a day.

Efficient? Compare it with other methods of materials handling. Inexpensive? Absolutely—surprisingly so in relation to the hidden costs of manual handling. Fast? Towmotor's moving and lifting speeds exceed anything in the industry!

Learn how a "Towmotored" materials handling system can save you time and money . . . for years to come. Towmotor engineers will be glad to survey your situation . . . without obligation. Write today.

TOWMOTOR COMPANY
1268 E. 152nd Street **Cleveland, Ohio**

Let TOWMOTOR (CLEVELAND) *take the load off your hands*



If the above has taken your mind from news of war and taxes long enough to figure out our message, maybe you would like further information, prices and samples. Be sure to outline what use you have in mind so we may answer you as helpfully as possible.

Paterson Parchment Paper Company

Headquarters for Vegetable Parchment since 1885
Bristol, Pennsylvania

West Coast Plant: 340 Bryant Street, San Francisco, Cal.
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Patapar Vegetable Parchment

Reg. U. S. Pat. Off.

Insoluble · Grease-resisting · Odorless · Tasteless · Boil-proof

FOOD EQUIPMENT NEWS

Water Heater

JOHNSON CORP., Three Rivers, Mich., has brought out an all-steel low-cost version of its "Instant" Water Heater. Design and construction are exactly similar to this company's Copper-Tube Heaters. It is used to heat water and other liquids with steam and can be connected to high pressure steam lines without the use of a reducing valve.

This heater is available for pressures up to 250 lb.

Bulk Conveying System

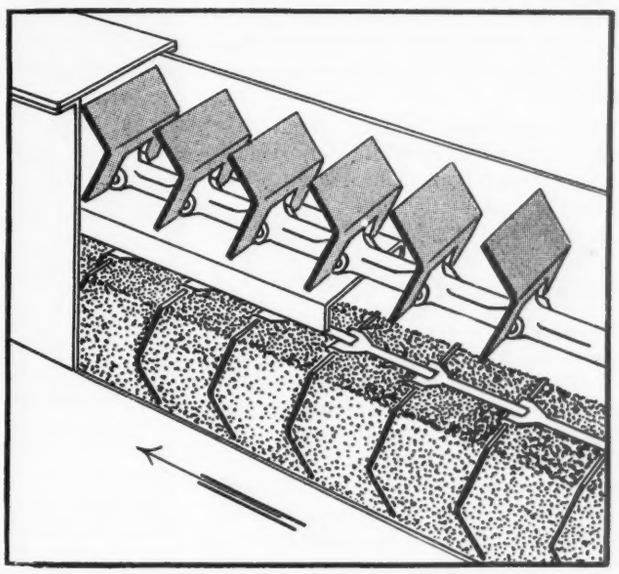
AFTER TESTING on a wide variety of materials handling installations, Link-Belt Co., 307 No. Michigan Ave., Chicago, has brought out the "Bulk-Flo," a power-operated conveyor system for the positive and continuous handling of flowable granular, crushed, ground or pulverized materials of a non-corrosive, non-abrasive nature. Its capacity is up to 140 tons per hour.

As shown in the illustrations, this is a conveyor of the endless chain type, operating within a dust-tight casing. The chain is of special design with solid peak-top flights rigidly attached at every pitch. These flights divide the material in the conveyor casing into a continuous series of batches. These are moved positively by the flights, whether the load is full or only partial.

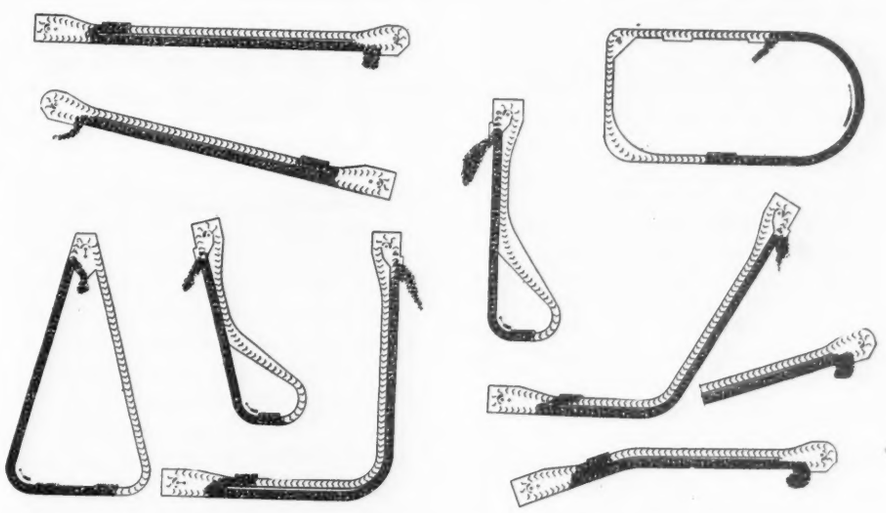
Being supplied with a continuous casing, the conveyor is compact and requires but a minimum of supporting structure. It is self-feeding and unloading, needing no separate feeder. Also, it operates slowly, moving the material gently and quietly, with minimum background but small power requirement.

This material handling unit can be designed to follow almost any desired path—horizontal, inclined, vertical or curvilinear, and a single self-contained unit will convey in all these directions in the same vertical plane. Loading and unloading can be at various points to suit conditions, as feed and discharge openings, also openings for inspection and access, are readily provided in the casing as needed. Loading is said to be uniform and gentle, from hoppers, bins or chutes, without overloading or flooding.

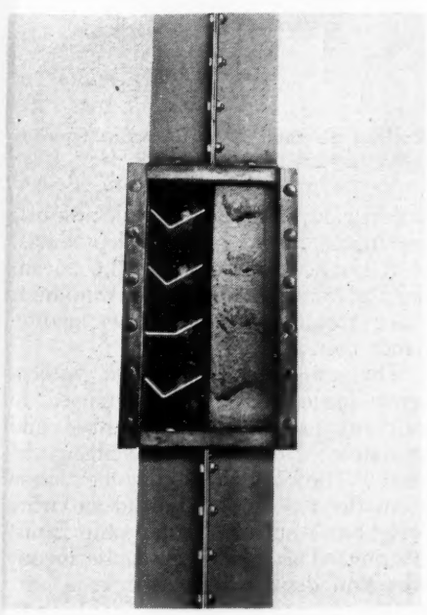
Compactness is a feature, permitting installation in close quarters. Other features claimed are smooth operation without churning, breaking or packing of the material handled, and long life because of slow movement and low power requirement. Clean discharge, because of shape of conveyor flights, and self-cleaning of the conveyor, are also claimed. Automatic relief is afforded to the material in passing around curves. As the flights are rigidly attached to the chain, they diverge radially at curves, preventing squeezing or packing action.



Drawing of the conveying chain of the "Bulk-Flo" conveyor, showing the rigidly attached peaked flights that move the material ahead.



Diagrams of typical arrangement of "Bulk-Flo" conveyors



View of "Bulk-Flo" conveyor with inspection cover removed, showing special clean-out flight at left as used for very free-flowing materials.

Non-Slip Footwear

FOR WORKERS in canneries, packing plants and similar locations, United States Rubber Co., Rockefeller Center,

New York, has brought out a line of patented, non-slip footwear. This footwear has the "Sperry Top-Sider" sole, originally developed for use on the slippery decks of sailing vessels. On the straight-away, this sole is perfectly smooth, and being made of pure white rubber, leaves no mark on any surface. In action, thousands of small rubber waves open up to create a squeegee effect.

The new line includes an all-white patrol rubber; an all-white Terra Haute; a light, short boot; a hip length boot, and a special marine boot.

Homogenizer

OPERATING upon a new principle, Creamery Package Manufacturing Co., 1243 W. Washington St., Chicago, is making a new type of homogenizer that has been thoroughly tested in the dairy field. Called the "Multi-Flo," the feature of this machine is a "Single Service Multi-Flo" valve, which effects homogenization by the interaction of many minute streams—crossing, mixing, diverging, and recrossing during the flow of the liquid through the valve. This is possible because the valve is constructed of resilient stainless steel, with a myriad of minute passages through it that are easily adjustable to give the desired operating pressure.

A feature of the use of this "single service" valve is that it makes easy the problem of keeping a homogenizer valve in good condition. Because it is an inexpensive unit, a new, clean valve with unimpaired efficiency can be used for each run of the homogenizer.

The makers claim that this new homogenizer not only does a better job with high efficiency, but that it also saves us to 35 percent in power for a given amount of processing.

Electric Stop Watch

PRECISION SCIENTIFIC Co., 1750 N. Springfield Ave., Chicago, has brought out a new model of Electric Stop Watch, known as "Time-It" Minute Model, run by a synchronous electric motor which operates a direct reading indicating counter. Accuracy of this instrument is covered by the cycle constancy of 115 volt a.c. supply. The device integrates to 1,000 minutes, reading in full minutes and hundreds of a minute. It can be reset to zero from any reading, or successive readings can be totalled.

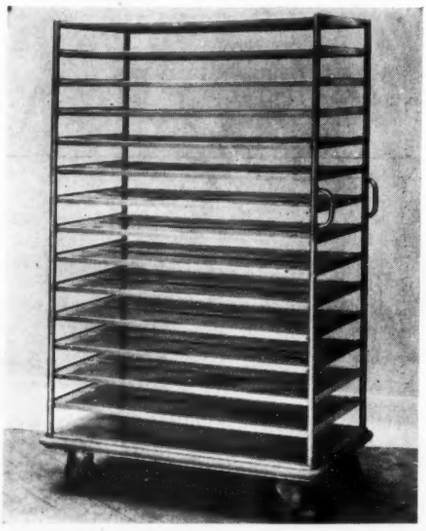
Timing device operated by electric current.

Static Protective Tires

RUBBER TIRES for industrial trucks made from a special compound with vastly greater electrical conductivity than ordinary rubber, have been developed by B. F. Goodrich Co., Akron, Ohio, for use where protection against static electric discharges is necessary for the avoidance of explosion and fire hazards. These tires are available in a complete range of sizes for pressed-on and vulcan types. Tests by the company are said to show that where the industrial trucks or tractors operate on floors of cement, brick, stone or metal, the new tires continually dissipate static electricity, keeping the vehicle and the floor at the same electric potential.

Shelf Truck

A SHELF TRUCK for the handling of such food products as pies and other baked goods has been developed by S. Blickman, Inc., Weehawken, N. J. This truck is made completely of stainless steel. Its shelves have holes to permit drainage downward to a flat bottom shelf that can be readily cleaned. The shelves are also ribbed in the center for extra strength and are made with raised edges to prevent the products from falling off. Rubber bumpers are supplied all around the truck, which is equipped with heavy duty rubber-tired swivel casters for ease of operation when fully loaded.

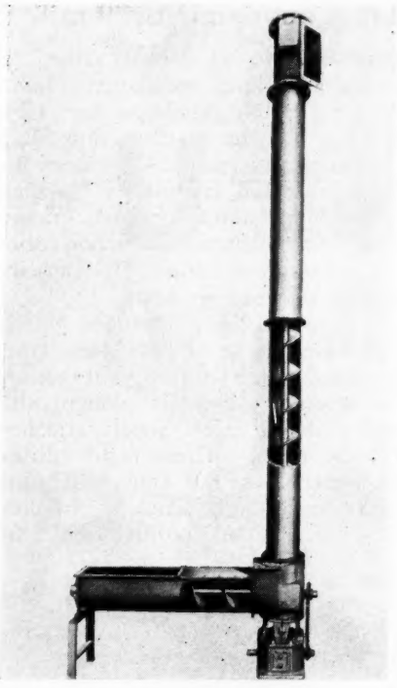


Stainless steel welded food shelf truck.

The entire truck is of welded construction, without bolts and screws, so that nothing can work loose. In construction, care has been taken to avoid all crevices or other dirt-catching places. Dimensions are 23 in. wide by 43 in. deep by 69½ in. high. Shelves are 21 in. by 41 inches.

Bulk Elevator

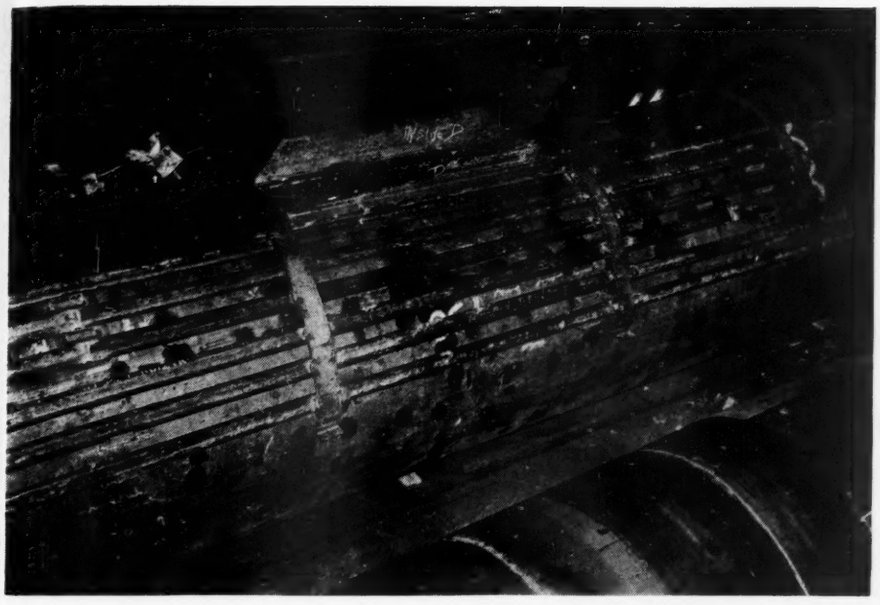
SCREW CONVEYOR CORPORATION, Hammond, Ind., has brought out the Hammond "Screw-Lift," which consists of a compact, dust-tight, moistureproof, vertical screw conveyor, operating in a tubular casing. This conveyor is designed for handling such materials as grain, flour, meal, peanuts, cottonseed, coffee, and cereal products. It is claimed that it offers the advantages of low installation costs, minimum space requirements, and low maintenance cost.



Material handling device of screw type for lifting dry food products

The conveyor is equipped with a screw feeder that can be arranged to suit any particular feeding need and is connected directly to the lifting element. The Screw-Lift may be driven from the top or bottom and its entire weight is suspended from a top thrust bearing. The discharge can be in any direction desired.

The driving mechanism for the conveyor consists of a totally inclosed lubricated drive unit. Timken roller bearings are provided to carry thrust and radial loads. The unit is said to be



Nickel clad tank car during fabrication, showing heating coils around bottom of steel side of tank.

easy to erect and dismantle, having but few operating parts. The power requirement is said to be just slightly more than that for bucket elevators of similar capacity.

Nickel-Steel Tank Cars

American Car and Foundry Co., Milton, Pa., are making nickel-clad steel tank cars suitable for the transport of sirups and other products that must be protected against metallic contamination. The tanks are of welded construction, made by the "Union-melt" process on the outside, while the interior of the butt joints are manually welded with pure nickel electrodes to provide an all-nickel lining.

These cars are provided with 6 in. of spun glass insulation contained in an outer casing of steel. They are provided with steam heating coils buried within the insulation so that contents can be heated for easy emptying.

The interiors of the cars are clad with nickel, the minimum thickness of which is 0.025 in. The nickel layer is rolled directly onto the steel to form a permanent bond.

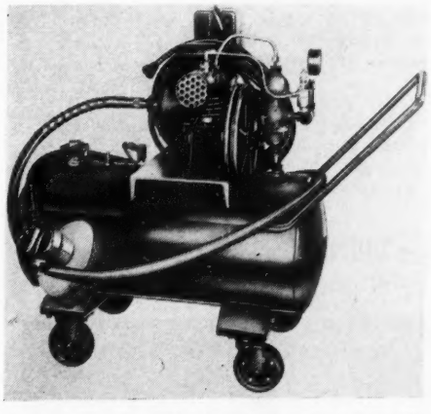
Power Rotary Scrubber

For doing such cleaning jobs as removing milk stone from plate pasteurizers, vats, etc., National Electric Manufacturers Co., 60 East 42nd St., New York, has developed a power rotary scrubber. As shown by the accompanying illustration, this machine embodies a solution tank mounted on swiveling casters. On this is mounted a motor and pump. The motor drives the rotary power brush and also feeds solution to the brush. The angle head can be removed and a solution feed tube cleaning shaft inserted up to 10 ft., for cleaning preheater, cooler and evaporator tubes. A solution feed scrubbing handle up to 36 in. long is also interchangeable and serves for such jobs as kettle cleaning. Also, a flexible polishing disk may be substituted for the rotary power brush for polishing the exterior of the plant equipment.

The manufacturer states that tests made with this machine show that it is possible to remove milk stone from pasteurizers in much shorter time than with other equipment, immediately after the day's last run. It is also stated that the machine leaves the equipment with a mirror-like surface that retards milk stone formation.

Oven and Dryer Construction

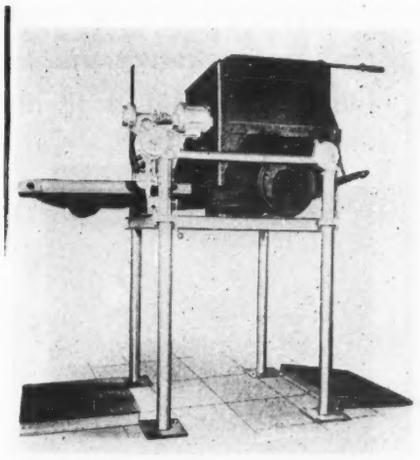
Johns-Manville, 22 E. 40th Street, New York, N. Y., has developed a new construction for ovens, dryers and other devices requiring heat insulation. This construction utilizes Marinite, a fireproof structural material with high insulating characteristics. Features of the design include maximum efficiency of insulation by elimination of through metal sections; easy removability and replaceability of sections; high resistance to corrosion; and ease of construction, because the panel can be worked with carpenter's tools. It is stated that use of this construction for ovens and dryers eliminates the need for a steel casing.



Power rotary scrubber for removing milk stone and for similar cleaning jobs.

Truck Servicing Device

For servicing electric industrial trucks, Walker Manufacturing Co. of Wisconsin, Racine, Wis., has developed a low price servicing lift. This lift is an adaptation of a similar device used for many years in the automotive servicing field. It consists of a frame upon which the truck is carried, the frame being mounted on four posts, upon which it is elevated by means of a hoist and cables. When the truck, in position on the hoist, is raised to the top of the lift, its underneath working parts are exposed in easy position for maintenance or repair.



Lift for servicing electric industrial trucks.

Angle Fittings for Temperature Control

In order to affix a perpendicular temperature control instrument to a kettle, or other heating container in such a way as to keep the tube of the instrument as close to the side wall of the kettle as possible, away from the heat and out of the way of work, Burling Instrument Co., 241 Springfield Ave., Newark, N. J., has developed a device known as the "Klosefitting" Heat Control Actuating Elbow or Angle Fitting. This consists of a hollow casting containing a fulcrum device, one end being in alignment with an opening in the bottom of the fitting, and the other

★ ★

CONTROL QUALITY—REDUCE WASTE
IN YOUR FOOD PROCESSING OPERATIONS
with Beckman pH CONTROL!

Beckman pH Control is rapidly becoming a vital part of many different food processing operations—in brewing, in processing milk products, in canning, in jellymaking, in refining sugar . . . wherever *acidity* or *alkalinity* affects quality, uniformity, color or flavor of the resulting product.

Why not investigate what BECKMAN pH Control can do for YOU in getting the job done better, faster—*for less?* Our experienced research staff will be glad to offer suggestions on what is being done in *your* field with Beckman pH Control.

THE MOST ADVANCED pH INSTRUMENT AVAILABLE TODAY!

This Beckman Automatic pH Instrument is finding wide application in controlling—*automatically and continuously*—the pH of many types of large-scale food processing operations. Can be set to *automatically* maintain your processing operations at optimum pH value, insuring more uniform quality . . . higher accuracy in controlling processing operations . . . less waste . . . and decreased production costs in *your* plant. This is the most advanced pH instrument available *anywhere* today. Operates directly from 115 v. A.C. current (no batteries) . . . and incorporates all the famous features pioneered and perfected by the Beckman research staff. *Send for Bulletin 16 describing this outstanding instrument!*

WHAT EVERY EXECUTIVE SHOULD KNOW ABOUT pH!

Every **food executive whether in the plant, laboratory, or front office should send for this informative booklet. Tells what pH is, its importance to modern industrial processing and where it is being used by others to cut costs, reduce waste, increase production. Write today for your free copy!**

THERE'S A BECKMAN pH INSTRUMENT for every application—from portable equipment for plant and field use to *completely automatic* equipment for large-scale process control. Our research staff will be glad to make recommendations to fit your particular requirements. Write, giving detailed information on your processing problem.

NATIONAL TECHNICAL LABORATORIES • SOUTH PASADENA, CALIFORNIA

WORLD'S LARGEST MANUFACTURER OF GLASS ELECTRODE pH EQUIPMENT

Beckman THE LEADING NAME IN pH

end in alignment with an opening in the side. Into the bottom outlet is screwed the lower tube of the instrument; that is, the active or sensitive part of the tube. Into the side opening the extension tube is screwed, its other end being attached to the instrument itself.

The manufacturer claims that this device is so perfectly balanced that the slightest contraction or expansion of the tube in the heated element immediately actuates the lever in the fitting, which in turn continues the proper expansion or contraction movement to the working part of the instrument. It is said that by means of this device it is possible to place the switch of the control in any desired position around the kettle, without taking up more than one inch of space from the edge of the kettle to the outside of the tube.

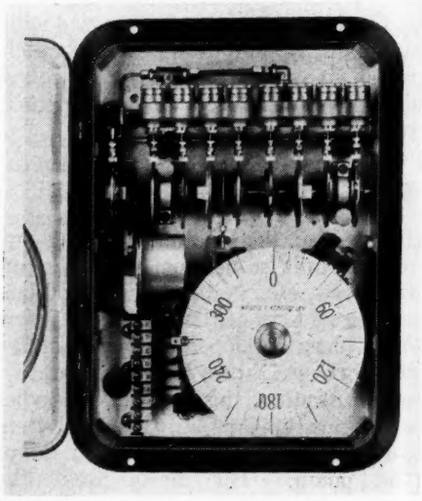
This new fitting is made for use only on the Burling line of instruments.

Time Cycle Controller

BRISTOL CO., Waterbury, Conn., has developed a multiple-cam time cycle controller, Model A-118 Impulse-Sequence Cycle Controller for timing mechanical operations in processing where a number of factors must be accurately timed according to a fixed program. In operation, this controller actuates or engages, at exactly the correct time in each cycle, the necessary mechanical, electrical or pneumatic devices for automatically carrying out the intended schedule.

In the controller, time measurement and pilot valve operation are handled by separate mechanisms. This is said to make possible a design that gives accurate timing of the factors under control, high speed and torque for pilot valve operation, and flexibility of application.

Timing is accomplished by a Tele-



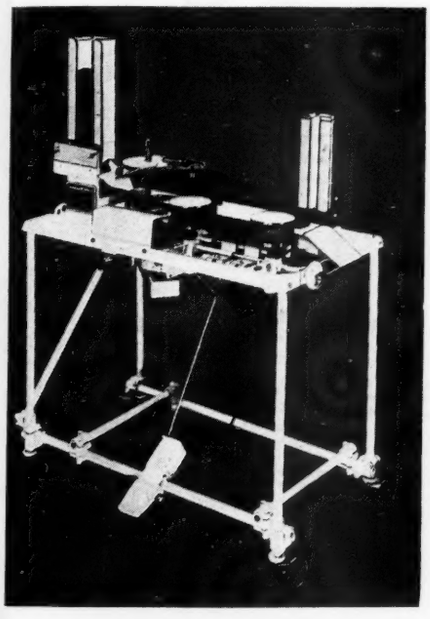
Time cycle controller

chron-driven aluminum disk on which is printed a 25 in. time scale. The desired schedule of operations is incorporated into the controller by punching holes on the time scale. These holes determine the time of operation of the cam mechanism. Cams are individually adjustable.

All controllers are drilled for a maximum of eight cams and pilot valves.

Container Sealing Machine

VERTEX Co., 40 West 4th St., New York, has brought out a container sealing machine that applies pressure-sensitive tape over the body and cover of cardboard and metal containers up to 5 in. diameter or square cross dimension. The machine requires but one operator. It has a capacity up to 1,000 containers per hour. It consists of magazine, feed arm, revolving plate,



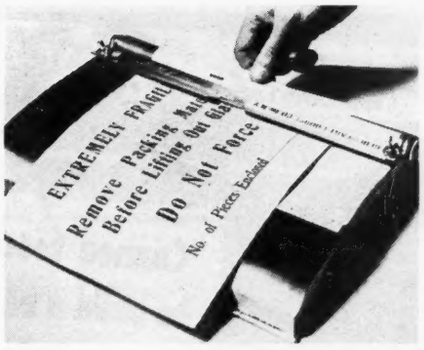
Sealing machine for applying tape seals to metal and cardboard containers up to 5 in. in diameter at rates up to 1,000 per hour.

and a pressure conveyor in which the tape is pressed tight to effect the seal. The cut-off is automatic.

Glue Spreader

GLUE-FAST EQUIPMENT CO., INC., 30 West 15th St., New York, has brought out a glue spreader for use in labeling operations such as affixing labels to cartons and shipping cases. These glue spreaders come in two sizes —6 in. and 12 in. in width.

In operation, the surface upon which adhesive is to be spread is placed against the adjustable guide and drawn by hand over the upper of the two rollers. The lower roller, inside the housing, dips into the adhesive reservoir. It



Glue spreader that can also be used as a moistener in labeling operations.

picks up adhesive and transfers it in an even coating over the full length of the upper roller. The upper roller, in turn, transfers an even coating of adhesive to the label.

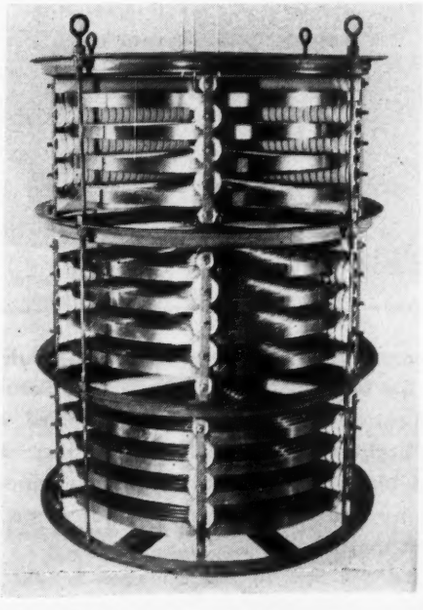
By changing the rollers, substituting cloth-covered rollers for the regular rollers, the spreader can be used as a moistener for pregummed labels.

Immersion Heater

H. O. SWOBODA, INC., 135 Thirteenth St., New Brighton, Pa., is producing a new line of Falcon electric immersion-type booster heaters suitable for such work as maintaining temperature in wax or paraffin used in coating container materials.

These heaters consist of spirally coiled heater strips arranged to form a compact unit. They are installed in a sealed tank built in the pipe line between the storage vessel and the coating tank. The temperature is maintained uniformly by automatic control.

Use of these heaters is indicated with materials that are non-conductors of electricity.



Immersion-type electric booster heater.

SPEED-UP FILTRATION

SHRIVER
PLATE AND FRAME
FILTERS
Provide
Increased Flow Rates
Better Quality
Use of Any Filter Aids

The combination of any material of construction, any capacity and provision for the use of any type of filter aids or decolorizing agents under any conditions of required temperature and pressure sets up in Shriver Filters the production advantages of better, faster, filtration at low operating cost.

This applies whether the product be syrup, oil, wine, vinegar or scrap candy and the need be for 10 or 10,000 gallons of filtered fluid per hour.

Shriver Filters give what you need to improve product quality.

Write for Bulletin 110

T. SHRIVER & COMPANY
860 Hamilton St. Harrison, N. J.

SHRIVER FILTERS
Clarify—Purify
Recover By-Products
Faster—At Low Cost

"Canned food is helping to build a new America," says Milo Perkins

As Administrator of the U. S. Surplus Marketing Administration, Milo Perkins was the world's largest buyer of canned foods. He invented the Stamp Plan for distributing surplus foods, and directed national expansion of the "one hot meal a day" program for undernourished school children. He is now Executive Director of the new Economic Defense Board. He says:

"If all the people in the United States could afford to eat and could be educated to eat all the vegetables, fruit, meat, fish, milk and other vitamin-rich foods they need to bring our national health up to a high level, there would be no surpluses of these foods.

"We would actually have to produce more meats, more of most fruits and vegetables, more dairy products to meet the demand. And we would be taking great strides toward making Americans the healthiest, strongest people in the world. We would be moving away from an era in which we have been commodity-rich but consumption-poor.

"Every mother, every housewife can play an important part in the National Nutrition Program if she will feed her family more vegetables, fruit, meat, fish and milk—more foods abounding in vitamins and minerals, including those prepared for convenient, economical use by the canners of America."

CHECK YOUR DAILY DIET BY AMERICA'S NEW "NUTRITION YARDSTICK"

(Recommended by the U. S. National Nutrition Council)

ARE YOU SERVING ENOUGH VEGETABLES? At least two servings daily, one of them a green leaf or yellow vegetable.

Canned vegetables are carefully prepared to conserve their natural vitamins and minerals, economical and convenient to serve, available in great variety all year round.

ARE YOU SERVING ENOUGH FRUITS? At least two servings a day. One should be a good source of Vitamin C, such as grapefruit (fresh or canned) and oranges.

Canned fruits are important sources of essential vitamins and minerals, are carefully selected for flavor and color, easy and inexpensive to serve.

ARE YOU SERVING ENOUGH MEAT AND FISH? One serving a day of meat or fish.

Canned prepared meats and canned seafoods are valuable protein foods, supplying important vitamins and minerals—practical and convenient to serve.

ARE YOU SERVING ENOUGH MILK? One quart for every child and every pregnant woman or nursing mother; at least one pint for every adult.

Canned milk is a wholesome, economical food—well balanced with important protective vitamins and minerals.

ARE YOU SERVING ENOUGH EGGS? At least one a day per person.

NOTE: Round out this protective diet with whole grain cereals and enriched bread, butter or vitamin-enriched margarine, and anything else the family likes to eat!

Contributed in the interests of the National Nutrition Program and the canners of America by

CONTINENTAL CAN COMPANY

MANUFACTURERS OF CONTAINERS FOR INDUSTRY AND DEFENSE NEEDS

Millions of consumers will see this full page, full color advertisement in the November 1st issue of The Saturday Evening Post. It's Continental Can Company's third advertisement supporting both the National Nutrition Program and canned foods, and No. 9 in our Post series designed to help our customers by promoting products that come in cans. Free reprints are available.

JUST OFF THE PRESS

BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Bread Slicer—The Battle Creek band bread slicing machine is described with specifications in a recent folder of Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich.

Canning Plant Equipment—Canning machinery for food products, with complete lines for peas, corn, tomatoes, beans, beets, fruits, milk and meats, is described in Catalog No. 36, Berlin Chapman Co., Berlin, Wis.

Evaporators—Long-tube vertical evaporators, suitable for gelatine, pectin, sugar, sirups, fruit juice and extract concentration are described, with photographs and process installation diagrams, in Bulletin E-100, Swenson Evaporator Co., Harvey, Ill.

Filters—Staynew and Protectomotor filters for compressed air, gases, liquids, engines and compressor intakes, and for building ventilation are fully described in a 44-page illustrated catalog containing specification charts and engineering data, published by Staynew Filter Corp., Rochester, N. Y.

Grinding Mill—A new, compact, vertical motor-driven hammer mill for grinding grain and similar materials is illustrated and described, with dimension details, in Leaflet B-6169 issued by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Milk Tanks—Glass-lined and stainless steel milk storage tanks, embodying exclusive new features including a sanitary rotary seal, are described with specifications and photographs in Bulletin No. 806, published by the Pfaudler Co., Rochester, N. Y.

Refrigeration Equipment—A 72-page general catalog of refrigeration equipment, covering such subjects as ice-making equipment, unit coolers, heat interchangers, water coolers, condensers, coils, blowers and baffles, giving descriptions, illustrations and specifications, has been issued by Kramer Trenton Co., Trenton, N. J.

Refrigerating Equipment — "Eclipse" refrigeration compressors, in sizes up to 60 tons capacity, are described with dimensions in Bulletin No. 100-B, issued by Frick Co., Waynesboro, Pa.

Refrigerating Equipment — Vacuum cold plates for use in truck and industrial refrigeration applications, are described and pictured, with specifications and application data, in Catalog No. 22 by Dole Refrigerating Co., 5910 No. Pulaski Road, Chicago.

Sifting Equipment—The "Blutergess" turbine sifter, a vertical, centrifugal sifting device, compact in design and speedy in operation, is described with specifications in illustrated Bulletin No. 52, issued by Abbe Engineering Co., 50 Church St., New York.

PLANT SUPPLIES

Clutches—Multiple disk friction clutches are described with drawings and specifications, in capacities from ½ to 3 hp. at 100 r.p.m. in a recent "Maxitorq" bulletin published by Carlyle Johnson Machine Co., Manchester, Conn.

Combustion Equipment—In Form VA-102, applications of Victor-Acme blowers and gas pumps with a wide variety of oil and gas-fired units, are discussed by Roots-Connersville Blower Corp., Connersville, Ind.

Electrical Supplies—Two-In-One Tape, a combination of splicing compound and friction tape in one tape, for use in plant maintenance work and other electrical service, is described in Catalog Section 9270, issued by B. F. Goodrich Co., Akron, Ohio.

Flexible Couplings—Three distinct types of flexible couplings are described, with specifications and prices, in Catalog No. 33, an 8-page illustrated bulletin of D. O. James Mfg. Co., 1120 W. Monroe St., Chicago.

High Pressure Pumps—A line of horizontal duplex plunger power pumps for the development of high pressures to serve hydraulic presses and similar equipment, are described with specifications in Bulletin W-412-B30, published by Worthington Pump & Machinery Corp., Harrison, N. J.

Industrial Trucks — "HydroLectric" motorized lift trucks and "Red Arrow" hand-lift trucks are described in two recent bulletins of Lift Trucks, Inc., 2425 Spring Grove Ave., Cincinnati, Ohio.

Lubricating System—The Alemite progressive lubricating system for industrial equipment is described in an 8-page bulletin, Form 22-34, published by Alemite Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill.

Pneumatic Tube Carriers—Applications of pneumatic tube carrier systems are described and illustrated in the 1941 edition of "Wings of Business" published by Lamson Corp., Syracuse, N. Y.

Steam Conduits — "Therm-O-Tile" steam conduits for underground steam piping systems, are described in Bulletin 381, issued by H. W. Porter & Co., Inc., Newark, N. J.

V-Belt Drives—In Catalog Section 2181, fractional horsepower V-belts are described with prices and sizes by B. F. Goodrich Co., Akron, Ohio.

PACKAGING

Dairy Product Packages—Packages for the dairy industry, for such products as butter, ice cream, cheese, and fluid milk are illustrated, with descriptions, in a new 16-page catalog of Sutherland Paper Co., Kalamazoo, Mich.

Frozen Food Package—The Cry-O-Pak, a combination of cardboard container and latex bag for packing frozen foods, whether in liquid, semi-liquid or solid form, is described in a recent bulletin of Container Corp. of America, 111 W. Washington St., Chicago.

CONTROL EQUIPMENT

Flowmeters—Meters for the measurement of the flow of steam; water; air; gas; and viscous, volatile or corrosive fluids, including the Linameter for difficult-to-measure fluids, the ring-balance meter for low-pressure gases, electrical and mechanical weir meters, and liquid level instruments are discussed with application information in a 52-page illustrated handbook, No. 3010, published by Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia, Pa.

Smoke House Control—Automatic control for smoke houses and the instruments used for the purpose are discussed in Bulletin No. 40-2, accompanied by diagrams, which has been issued by the Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

Valve Positioner—A valve positioner for use in overcoming valve friction in control systems is described in a leaflet issued by Moore Products Co., 3629 No. Lawrence St., Philadelphia, Pa.

Rub it-Scrub it!

ENDURO RETAINS ITS FINISH YEAR AFTER YEAR

Rub and Scrub—rub and scrub! Day after day, food processing and handling equipment must be cleaned—*and cleaned thoroughly*—to insure absolute sanitation and freedom from contamination.

In such service, Republic ENDURO Stainless Steel "shines."

Whether it's used for a milk preheater, as shown above, in which the natural stickiness of milk at elevated temperatures necessitates vigorous cleaning, or for a tank, kettle, vat, chute, table or other equipment, Republic ENDURO is just as lustrous, sanitary and inert to foods after days and years of cleaning as when new.

ENDURO is solid stainless steel throughout. Any wear resulting leaves the same flavor- and quality-protecting metal. Cleaning costs are lowered. Maintenance and replacement costs drop.

For any type of food processing or handling equipment, think first of Republic ENDURO Stainless Steel—the metal with the cleanliness of glass and the strength of steel. You may find much of interest in booklets on ENDURO. May we send them?

REPUBLIC STEEL CORPORATION

Alloy Steel Division: Massillon, Ohio
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REPUBLIC STEEL
DEFENSE FOR AMERICA

OUT OF TODAY'S EMERGENCY

When a peacetime tomorrow arrives, we shall find that out of today's emergency have come *better* Republic Steels to improve our everyday life.

The steels which enable us to build faster warplanes, stronger tanks, guns and battleships will mean finer automobiles, railroad trains and machinery — better washing machines, refrigerators and thousands of other products in which steel makes life more livable, more comfortable, more enjoyable.

And when that tomorrow comes, Republic will be ready with greater capacity for producing these steels than ever before.

R. J. Wysor
PRESIDENT

REPUBLIC *Enduro* STAINLESS STEEL

REG. U.S. PAT. OFF.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

FOOD TECHNOLOGY

Mold Inhibition On Cheddar Cheese

Propionic acid and other chemicals have been tried in various concentrations as mold inhibitors on Cheddar cheese cuts enclosed in a moistureproof cover. It was found that immersion in 8 percent propionic acid solution in water is a feasible method for increasing the mold resistance of packaged Cheddar cheese. Close-fitting wrappers keep the cheese mold-free longer than do loose-fitting wrappers. Immersion time and drainage conditions are factors which should be carefully controlled in this treatment. Cheese treated in this way remained mold-free 12 to 38 days at 60 deg. F., as compared with 3 to 5 days for untreated cheese. A solution of calcium propionate or sodium propionate may be used instead of propionic acid, but the propionate concentration must be 14 to 16 percent to give the same effect as that of 8 percent free propionic acid. Benzoic acid and sodium benzoate in the permissible concentrations are less effective than 8 percent propionic acid. Alcohol at 70 percent or higher has about the same effect as 8 percent propionic acid.

Digest from "Mold Growth on Cheddar Cheese and its Control," by Frederick W. Miller, Jr., *Proceedings of the First Conference*, Institute of Food Technologists, 1940, p. 153.

New Method Used To Increase Spice Flavors

PRINCIPAL sources of spice flavor are within the essential spice oils, and these spice oils are generally contained within the cell structure of the spice.

The new method for increasing the quality and also yield of spice flavors is to subject the spice materials to an explosive procedure in order to substantially disrupt the body structure or the cell structure. The cell structure is more completely broken down when this method is used than by the ordinary crushing, grinding and similar methods, thus resulting in an increased yield and more concentrated flavor.

The explosive process consists of placing the spice, or flavoring materials, under an elevated temperature and pressure for a certain period of time. Then it is immediately and instantaneously released to a lower pressure and temperature so as to explode the cell walls. After this process is completed, the spice or flavoring material is then subjected to the ordinary extraction methods.

Digest from U. S. Patent 2,246,528 (granted to Alert Musher of New York City on June 24, 1941).

Quick Test To Detect Bacteria in Canned Food

CERTAIN species of spore-forming, anaerobic bacteria commonly met with in canned foods grow vigorously in a special milk medium in which they yield striking reactions. This fact forms the basis for a method of detecting small numbers of spores without requiring anaerobic cultivation and minimum use of the microscope for identification.

Positive reactions are readily visible and frequently sufficiently distinctive to allow a rough classification of different types of bacteria. Of course, complete identification is not possible without further tests. Aerobic bacteria can usually be distinguished visually from anaerobes, and the presence of both together can generally be recognized.

This method is very useful in the routine examination of large numbers of samples of canned meats, fish, soups, etc.; with slight modifications it is also applicable to nonacid vegetables, such as beans and dairy products, especially canned cream and evaporated milk. It is, however, not practicable with highly acid products, such as tomatoes.

These reactions are produced by:

ANAEROBIC SPECIES:

1. Neutral or alkaline, purple color, gas production, soft curd followed by rapid digestion of the casein, often to a clear, brown liquid. A black sediment is formed, accompanied by a typical foul odor, indicating *Cl. putrificiun; Cl. sporagenes; Cl. flabelliferum; Cl. sedematiens; Cl. hystolyticum.*

2. Very soft curd within 2 or 3 days, no change in reaction, slight gas formation, complete digestion—later with alkaline reaction, no odor. *Cl. centrosporogenes.*

3. Slight acidity, slight yellow color, soft curd, whey, slight gas formation. *Cl. sphenoides.*

4. Acidity, bright yellow, firm clot, gas; occasional bleaching of the indicator, included in the medium. *Cl. butyricum.*

5. Acidity, "stormy" clot, *Cl. welchii.* Less gas and cloudy whey—usually *Cl. tertium.*

AEROBIC SPECIES:

6. Strongly alkaline, peptonization from the top down, incomplete digestion, no blackening, no odor, no gas production. *B. subtilis; B. vulgatus.*

7. Acid, clot, no gas, or slight acidity only, peptonization in some cases. *B. cereus; B. coagulans; B. silvaticus.*

Similar reactions are produced by various cocci which may gain access to the food owing to leakage of cooling water into faulty containers.

Digest from "The Routine Detection of Certain Spore-forming Anaerobic Bacteria in Canned Foods," by E. L. Crossley, *Journal Society Chemical Industry*, Vol. 60, 131, 1931 (Published in England).

QUALITY CONTROL

Ultraviolet Rays in Vegetable Hydrocoolers

A METHOD has been proposed to permit observations of the penetration of ultraviolet light to various materials, particularly liquids. The light was able to penetrate 13 cm. of distilled water without apparent diminution of energy. Because of physical limitations in the equipment, greater distances were not studied. Turbid waters (such as might be encountered in hydrocoolers) quickly decreased the effectiveness of the light. The effect beyond 2 cm. was very slight in such water.

The present method of installing the light in vegetable hydrocoolers was found to be unsatisfactory. This method involves the suspension of the light above the water.

It has been proposed that the ultraviolet tube be submerged in the liquid

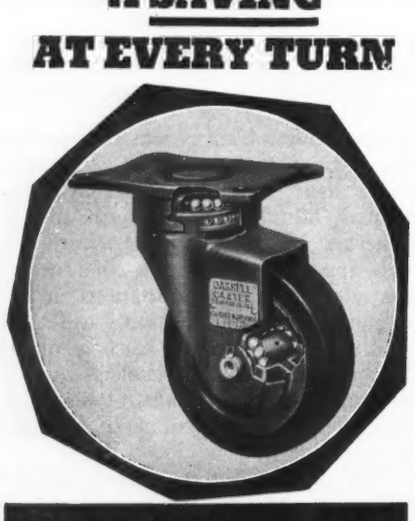
Different & Better

There is no doubt about SAVINGS when you demand

DARNELL

Precision-made Darnell Casters with the DOUBLE BALL-BEARING SWIVEL assure a long life of efficient, economical service

A SAVING AT EVERY TURN



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to be treated. By this method a quite noticeable decrease was observed in the bacterial content of water even though the water was circulated around the light at a speed of about 69 gallons per minute. Although turbidity decreased the effectiveness of the lamp, it did not completely remove the activity.

At very low temperatures, 1 to 2 deg. C. (33.8 to 35.6 deg. F.), the action of the light was greatly decreased. This decreased activity resulted from a decrease in the energy coming from the lamp.

Digest from "A Study of the Germicidal Action of Ultra-Violet Light. I. Use of Ultra-Violet Rays in Vegetable Hydrocoolers," by F. R. Smith and R. L. Perry, *Food Research*, July–August, 1941, pp. 345–361.

How To Measure Quality of Vegetables

TESTS of vegetable quality by groups of tasters are subject to so many personal factors that they cannot be accurately reproduced. The need of scientific accuracy in vegetable testing led to a comprehensive chemical study of peas in 1910, but no satisfactory test was developed until many years later. At present the most useful tests for maturity and quality of peas are the determination of alcohol-insoluble solids as advocated by Kertesz (1935) and the tenderometer test (Martin, 1937) which measures shearing pressure under a mechanical action approximating mastication. The tenderometer is considered best for easy, rapid grading of raw peas by operators (who need not be technically trained), while the best grading index for canned peas is the content of alcohol-insoluble solids.

The problem is different in grading frozen vegetables. For taste tests they would have to be thawed and cooked. After detailed search for a chemical or physical test which would agree with the judgment of expert tasters, the New York State Agricultural Experiment Station developed a modification of the alcohol-insoluble solids tests, applied after sealing the peas in a "Pliofilm" bag and thawing in hot water. For faster routine testing, a modified specific gravity method was also developed with xylene-carbon tetrachloride as the float-or-sink liquid. The same two tests, serve also for maturity testing and grading of frozen corn, for which the specific gravity test proved even more satisfactory than for peas. Results indicate these tests may be used on other vegetables.

Digest from "Determination of the Quality of Vegetables," by F. A. Lee, *Proceedings of the First Food Conference*, Institute of Food Technologists, Vol. 33, 1940; also *Technical Bulletin* No. 256. New York State Agricultural Experiment Station, March, 1941.

BEVERAGES

Improvement in Wine Processing

THIS improved process relates to the making of wine and has for one of its objects an improved process that will more rapidly produce wine of improved flavor and bouquet. Utilization is made of the beneficial elements in the lees for the production of both wine and brandy.

The brandy may be used either alone or for fortifying the wine. The new process prevents loss of alcohol during the wine processing period, thereby reducing the likelihood of loss through bacteriological or mycological infection.

The new process reduces the long period of racking, and the proper fermentation of the juice is substantially insured while at the same time the essential elements for insuring the desirable bouquet and flavor are supplied. This method also includes improved methods for separation of the lees from the juice and the insolubles from hot newly fortified wines.

Digest from U. S. Patent 2,249,830, granted to Frank W. Hopper, Selma, Calif., on July 22, 1941.

MEATS

New Method For Preserving Meat

PREVENTING dehydration and minimizing the growth of bacteria and the formation of mold is the basis for a new method of protecting and preserving meat.

Large sections of beef, lamb, pork, ham, or the like, are most applicable a protective covering with a jelly-like a protective covering with a jelly-like substance that covers all exposed parts and is of such a composition that it will not support the growth of mold on the outside, will seal the product hermetically and will contain an active ingredient toxic to bacteria. The coating is quite harmless to consumers of the product.

The coating material consists of water, acid and a metallic pectinate (nickel or cobalt), together with sugar of an appropriate type, or glycerine or other alcohols in place of sugar. All ingredients are mixed in a proportion to give a coating having the desired characteristics.

After the coating has been applied, the product may be subjected to chilling or freezing and held at a low tem-

perature without loss of weight by dehydration and without deterioration by the formation of bacteria and mold.

The metallic pectinate, which is toxic to bacteria and constitutes an important ingredient of the protective coating, consists of pure pectin combined with nickel or cobalt (or salts of these, such as nickel and cobalt sulfate or nickel ammonium sulfate) in the proportions of about 0.2 to 1.0 percent of nickel, or cobalt, by weight.

A high-strength jelly coating consists of 2⅓ lb. of 200-grade slow-set metallic-pectinate dispersed in 100 lb. of water and 233 lb. of sugar. To this is added sufficient acid, either lactic, tartaric, citric or malic so as to give a pH of approximately 3.0. This compound is suitable for dipping the meat in as a means of applying the coating. When applied differently, the amount of ingredients is varied accordingly.

Digest from "Method of Protecting and Preserving Food Products," by A. C. Dickinson and P. B. Myers, U. S. Patent 2,245,576, granted June 17, 1941.

DAIRY PRODUCTS

Microorganisms and Flavor Of Milk Products

The principal milk products in which flavor is developed by micro-organisms are culture buttermilk, butter and cheese. Flavor is defined as the combined sensations of taste and odor. Culture buttermilk depends on two streptococci, one of which forms lactic acid and is readily controllable. The other decomposes citric acid, forming diacetyl and other flavor factors, but yields fluctuate because milks vary widely in citric acid content. Some milks are benefited by adding citric acid.

Organisms used in making butter are in general of the same type as for culture buttermilk. Diacetyl is again a prominent flavor factor. Acetic and lactic acids also influence flavor, the latter more especially in unsalted butter.

Flavor development in cheeses is complicated, commonly requiring suitably proportioned growth of two or more organisms. Undesirable organisms thrive in the same environment, thereby hampering development of the most desirable flavor. Swiss-type cheeses need both propionic and lactic acid bacteria for their typical flavor.

Recent studies indicate that flavor in Cheddar-type cheeses demands more than the proteolytic action of lactic acid bacteria. There must also be some hydrolysis of fats, presumably by enzyme (lipase) action rather than by

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bacteria. Pasteurization destroys the lipase in raw milk, so that ripening is quite different from that of a raw-milk cheese. Roquefort-type cheeses require a blue mold, the usual choice being *Penicillium roqueforti*. Methyl ketones (e.g., methyl-n-amyl ketone), formed from lower fatty acids, imparts a special flavor to this type of cheese.

Digest from "Flavor Development in Dairy Products by Micro-organisms," by B. W. Hammer, *Proceedings of the First Food Conference*, Institute of Food Technologists, 1940, p. 279.

Skim Milk or Whey In Soup

A STUDY of the dried soups made with different quantities of whey or skim milk solids indicated that the optimum concentration of these ingredients was 25 percent of the total soup solids. Skim milk produced more milk flavor and a heavier body in the reconstituted soup than did an equal amount of whey. When the whey solids in the dried soup exceeded 25 percent of its total solids, a pronounced whey flavor was noticeable in the reconstituted soup. If the skim milk or whey solids in the dried soup were less than 10 percent, the favorable effect of these constituents on the body and flavor of the reconstituted soup was slight.

Digest from "Utilization of Skim Milk and Whey in Precooked Dried Soup," by G. A. Ramsdell and C. H. Webb, *Food Research*, May–June, 1941, pp. 265–271.

SUGAR

Carbons for Decolorizing Sugar

EFFECTIVE sugar-decolorizing carbons can be made from coal or coal refuse, but high ash content in the raw material is an unfavorable factor. Coal mine waste has been successfully used in making active carbons for water purification, but a good water purifying carbon is not necessarily effective in decolorizing sugar solutions. Comparative tests have shown that the difference is in a greater degree of burning, apparently because larger capillaries are produced in the sugar-decolorizing carbons.

Carbons were prepared from a low ash coal (washed, ash 5.5 percent) and from two samples of coal-mine refuse. Of these one contained 60.5 percent ash, and after fractionation on a coal-washing table fractions with 21.1 and 41.8 percent ash were used to make carbons. The other contained 61.0 percent ash, and a single fraction with only 10.1 percent ash was taken from it for making active carbon. After steam activation of the carbons from these samples a further increase in decolorizing power was obtained by acid treatment, excepting in the char from low-ash coal, which was already superior to a high-grade commercial carbon adsorbing 90 percent of the color from a standard sugar solution. Test results, according to the ash content of the raw material, are shown in the following table:

Percent ash in raw material	Percent color adsorbed after: Steam activation	Acid treatment
41.8	12	24
21.1	35	48
10.1	68	88
5.5	95	94

Digest from "Activated Carbon for Sugar Decolorization," by E. S. Hertzog and S. J. Broderick, *Industrial and Engineering Chemistry*, Vol. 33, 1192, 1941.

MISCELLANEOUS

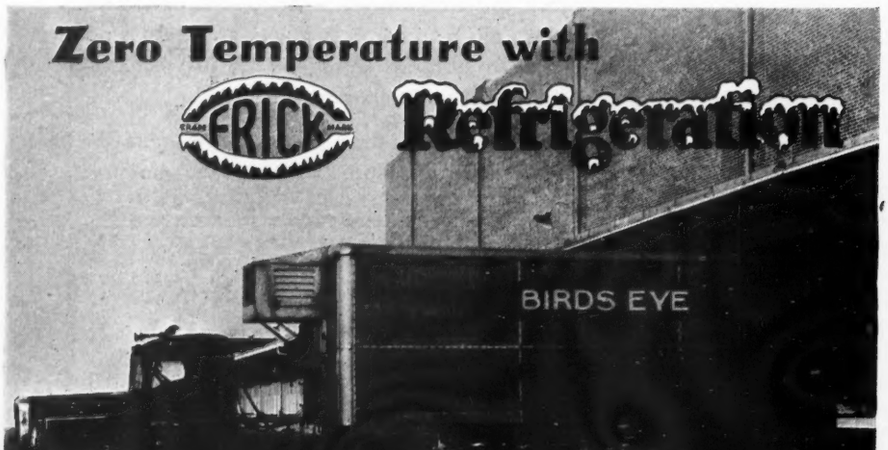
Bacteriological Problems in the Dairy Industry

MANY dairy plants have installed a high-temperature, short-time system of pasteurization and have found that their previous methods of laboratory control were inadequate. Where they had been using either a raw milk count or a direct microscopic count, or the methylene blue reduction test, used alone neither of these tests could properly detect the presence of thermoduric microorganisms in their present milk supply. A relatively simple method was needed that would solve the problem of detecting thermoduric bacteria.

The solution to this problem was solved by using the resazurin test. The test uses 1 c.c. of a 0.005 percent solution of resazurin for 10 c.c. of milk collected in sterile test tubes. The samples were incubated at 37.5 deg. C., for 2 hours and then graded. The grading of the milk was on the basis of the amount that the dye had been reduced in color during the 2-hour test period. If the dye was entirely reduced to white, the milk was considered bad; partially reduced to pink, poor; slightly reduced to lavender, fair. The milk was considered to be in good condition if the dye remained blue.

From tests that have been made, it has been proven that the substitution of the resazurin tests for methylene blue tests will be of great benefit. For plants that have available bacteriological equipment, the combination of the resazurin test, with raw and laboratory pasteurized plate counts, is an almost infallible method of quality control.

For small plants that cannot afford



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bacteriological equipment, the resazurin test used exclusively is a relative accurate index of thermoduric contamination.

Digest from an article presented at the American Dairy Science Association meeting, Burlington, Vt., June 23–27, 1941, by Harold Wainess.

Sparkling Cider

CIDER can be converted to sparkling cider in only five days if the secondary fermentation is conducted under optimum conditions with an active strain of wine yeast well supplied with yeast food and supplements. Fermentation is faster at 70 deg. F. than at slightly higher or lower temperatures. When fermentation is conducted in glass-lined pressure tanks the speed of carbon dioxide production is greatly increased by adding apple juice or an apple juice concentrate and a small amount of diammonium hydrogen phosphate. Inoculation with a fast-fermenting starter of a well-selected champagne yeast will then lead to a secondary fermentation developing 90 lb. carbon dioxide pressure in only three or four days. Chilling and bottling then take another 24 to 36 hours.

Flavor of the sparkling cider is improved if tannic acid is added before the secondary fermentation (1 lb. to 200 gal. of dry cider). A small addition of invert sugar and apple brandy at the time of bottling also improves flavor.

Digest from "Bulk Fermentation Process for Sparkling Cider," by D. K. Tressler, R. F. Celmar and E. A. Beavens. *Industrial and Engineering Chemistry*, Vol. 33, 1027, 1941.

Ascorbic Acid Content Of Pigmented Fruits

FRUITS have been found to have a daily variation in ascorbic acid content. This is probably caused by differences in the part of the season, ripeness, amount of sun and quantity of rain. There has been pronounced varital difference in the fruits, and different portions of an individual fruit were found to have great differences in ascorbic acid content. Peach skins contain two to four times as much ascorbic acid per gram as the pulp. Eggplants have a higher ascorbic acid content in the skin, with little difference between the portion immediately under the skin and the center portion.

The ascorbic acid content of strawberries is 0.40 to 1.04 mg. per gram; raspberries, 0.13 to 0.30; blueberries, 0.13 to 0.20; plums, 0.03 to 0.10; peaches, 0.07 to 0.13; turnips, 0.32 to 0.47; blackberries, cherries and dewberries, contain very little vitamin C.

Eggplants show small losses of ascorbic acid in storage, with temperature, on the whole, playing a minor role.

In manufacturing fruit juices, much vitamin C is lost in preparing the fruits for juicing. The loss of ascorbic acid is immediately inhibited by heating. The temperature of pressing has little effect on ascorbic acid retention if the fruit is heated between 60 to 76.7 deg. C. (140 and 170 deg. F.), although the pressing process causes some loss. In the experimental work reported, the ascorbic acid content is inversely proportional to the amount of sugar added, even when compared on a sugar-free basis. This may be caused by oxidation, by air incorporated while stirring in the sugar. Storage in glass bottles in a dark room causes no appreciable change.

In apple juice prepared from the Greening variety and that from a mixture of Greening and Cortland varieties, there was less vitamin C than in the pomace after pressing out the juice. This was not true for the Baldwin apples. Apple juice as commonly prepared is very low in ascorbic acid.

Digest from "Ascorbic Acid Content of Pigmented Fruits, Vegetables and other Juices," by Mary Mann Kirk and Donald K. Tressler, *Food Research*, July–August, 1941, pp. 395 to 411.

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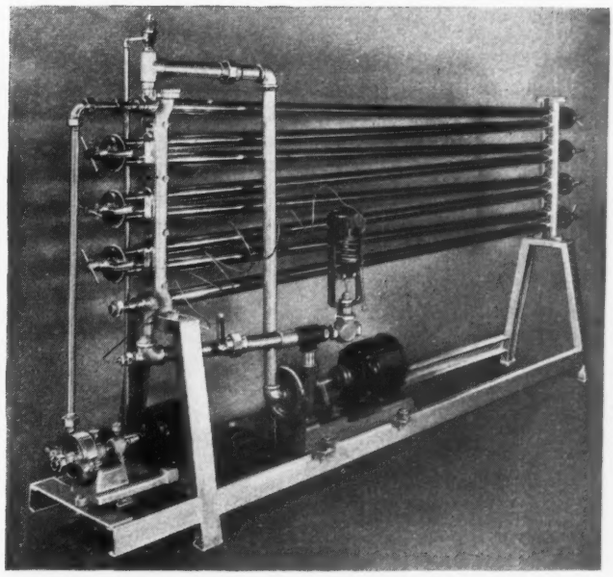

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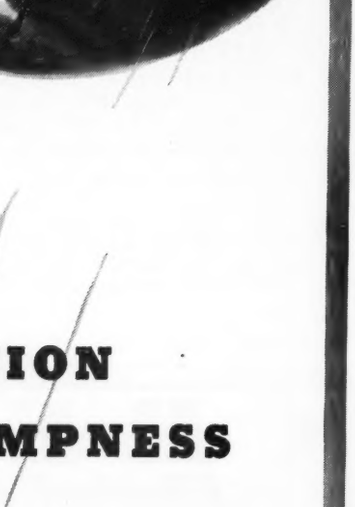

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BOOKS

Hypochlorite Efficiency

FACTORS AFFECTING THE GERMICIDAL EFFICIENCY OF HYPOCHLORITE SOLUTIONS. By A. S. Rudolph and Max Levine. Published as Bulletin 150 by Iowa Engineering Experiment Station, Ames, Iowa. 48 pages; 6x9 in.; paper. Free.

How temperature, pH and concentration affect the germicidal power of hypochlorite, as determined by a laboratory study, is reported in this bulletin.

In general it was found that quadrupling the concentration effected a reduction of approximately 50 percent in the time required to kill 99 percent of the exposed spores of *B. metiens*, the test organism. Doubling the concentration of the available chlorine reduced the killing time by about 30 percent.

In respect to temperature, it was observed that the killing time was reduced from 60 to 65 percent by a rise of 10 deg. C.

Banana-Food Formulas

BANANA BAKED GOODS RECIPES. Published by Monroe "Boston" Strause, 50 Church St., New York, N. Y. 41 pages; 6½x9½ in.; paper, loose-leaf binding. Free.

Formulas for 21 baked banana products are given, including such items as banana bran bread, banana bran muffins, banana tea cake, banana drop cookies and banana delight pie.

The ingredients of the formulas are given in both wholesale and retail quantities. Production directions are included, and appropriate merchandising suggestions appear at the end of each formula.

New Data on Oranges

A PHYSIOLOGICAL STUDY OF CAROTENOID PIGMENTS AND OTHER CONSTITUENTS IN THE JUICE OF FLORIDA ORANGES. Technical Bulletin No. 780. By Erston V. Miller and J. R. Winston. Published by the U. S. Department of Agriculture, Washington, D. C., 1941. 32 pages; 6x9¼ in.; paper.

The methods and results of a study of seasonal changes in total carotenoid pigments, total soluble solids, total acids, active acidity, and ascorbic acid in the juice of Florida oranges of both the sweet (*Citrus sinensis*) and the mandarin (*Citrus nobilis*) types are presented in this bulletin.

During the period of the observations (September to March) the early and midseason oranges showed a gradual in-

(*Turn to page 96*)

Dried-Egg School

(*Continued from page 42*)

How To Get Quality

Instead of heat-treating to improve or protect the quality of dried eggs, Epstein recommended the following:

1. Use only sound shell eggs.
2. Candle out all "leakers" and "checks" as well as bad eggs.
3. Keep shell eggs at low temperatures.
4. Do not use excessively dirty shell eggs.
5. Do not permit sweating by bringing eggs direct from cold storage into humid air.
6. Train girls to have good breaking technic and keep questionable drip out of liquid eggs.
7. Wash pails, breaking equipment and tables twice daily.
8. Keep perfumes and cosmetics out of breaking room.
9. Hold liquid eggs at 40 deg. F., or lower, until sent to dryer.
10. Avoid contamination of dried eggs during cooling, handling and packing operations.

Sterilization by irradiation, sonic vibrations, osmosis or chemical treatment is not yet practical. Irradiation promotes oxidation and rancidity of fat content. Chemical treatment is not permitted by food laws and public health enforcement officials. However, the eggs may be treated or dried, their bacterial count is not to be considered in any light other than that of a relative index of the total bacteria content. High-quality eggs will have relatively low bacterial content.

Since whole eggs are not fermented before drying, Victor Conquest, Armour & Co., limited his discussion on fermentation to egg whites. The reason for fermentation is to remove the sugar content to avoid darkening during storage, to raise the acidity of the whites with the result that they become liquid and easily pumped, and to improve whipping qualities.

Fermenting Procedure

Fermentation should be done under bacteriological and production controlled conditions. The process may be started by a pure bacteria culture or by seeding from a previous good batch. The best temperature level and time period is between 80 to 85 deg. F. for two days. While wooden vats may be used, they are conducive to infection. Immaculate cleaning between runs is imperative. Metal equipment is preferred.

During fermentation, foam forms through the liberation of mucin from the albumen and rises to sweep proteolytic bacteria, chalaza, bits of egg yolk and small dust or dirt particles out of the albumen. Special treatment of the whites will permit the use of the foam without an undesirable effect upon the odor or flavor of the dried egg whites. Success of the fermentation process is directly measurable by the odor of the finished product. Whites contaminated by proteolytic bacteria are usable only for technical albumen.

Although neutralization of high acidity in egg whites has been carried on in times past, statements were made that the practice has been discontinued under present-day production procedure.

Uncontrolled fermentation develops high acidity and the Chinese practice was to add NH_4OH and depend upon drying conditions to dispel the excess and possibly break up and volatilize some of the salts formed. In some instances addition of acids was resorted to as a substitute for fermentation to bring about liquefaction of the whites and liberation of the mucin. When that practice was followed, Na_2CO_3 was added to neutralize the excess acid.

Such treatments not only resulted in the production of a low-grade product compositionally but also in an egg white with low or no whipping properties. Whipping quality is the property that gives egg whites their market supremacy over other forms of protein, for the baking and confectionery industries particularly.

Temperatures and pressures at which egg spray drying should be carried on are not yet fully known, according to Paul Kennedy of Henningsen Bros., pioneers in the egg-drying industry. Whether the low-pressure wheel or centrifugal type or the high-pressure nozzle type of distributor of liquid eggs into the drying chamber is used, no definite temperatures, pressures or times of drying can be given. The temperature of the intake air, atmospheric humidity, rate of liquid egg flow from the centrifugal or nozzle distributor, and type of powder to be made regulate the rate of drying and the temperature of the outlet air.

Drying Data Lacking

Operations are largely carried on under the guidance of an experience chart worked up on a trial and error basis. In fact this chart is a record of experimental conditions and procedure followed to get a type of product or to obtain a repeatable production performance. The procedure followed may be changed several times a day because of changing weather or temperature conditions out of control of the plant operator. Need for a thorough study of the thermodynamics of egg drying is evident from the lack of engineering data dealing with egg-drying operations.

Even factors of storage affecting the quality of dried eggs are in need of further study. A progress report on studies by L. B. Mink, Swift & Co., indicates some of the factors to be interrelated. Temperature of storage, design and construction of container, and the temperature of the dried eggs at time of packaging are particularly dependent upon each other. Moisture content, metal content and bacteria count are also factors to be considered. The samples under test contain 6 percent moisture and after 5 months show no particular change whether in a friction-top tinned container, a sealed glass jar, a nonparaffined paper container or a paraffined paper container.

Incomplete tests indicate that 70 deg. F. should be regarded as the highest advisable storage temperature and that the package should permit breathing. The contents of sealed tin and glass containers have a stronger odor than do the contents of paper containers. Also, the contents of glass containers show evidence of bleaching and development of acidity and rancidity.

For bulk storage, 200-lb. barrels lined with double kraft paper bags impregnated with paraffin show promise. The contents of barrels stored four days at 0 deg. F. and taken into a 95- to 100-deg. F. room showed no change in moisture content, although samples were taken near the outer edge, halfway in and at the center of the barrel. The effects of a long storage period are yet to be determined. Preliminary studies indicate that storage at normal room temperatures is preferred to storage at refrigerated or cold-storage temperatures.

Packaging for Britain

Mr. Termohlen announced that, although they first wanted their dried eggs in 200-lb. barrels, lately the British are expressing their wants in terms of 12½-, 25-, and 50-lb. containers, preferably square tins, packed in wooden boxes to make units of 200 lb. net weight. Because of handling difficulties, United States authorities have cut the 200-lb. units down to 100 lb. net weight.

Indications are that the British will want 50 percent of their shipments made in containers smaller than 200 lb. net weight. Experimental shipments are being made in different types of containers so as to study the effects of changing conditions and time of shipment and storage. Mr. Termohlen recommended close cooperation between dried-egg manufacturers and packaging material suppliers through the technical committee of National Egg Producers Association for the solution of packaging problems.

Preliminary to that cooperative work, a representative of the executive committee of Associated Cooperage Industries of America reported that a short-

age of 3/4-in. staves made the 200-lb. barrel difficult to supply. With 45 stave manufacturers equipped to make 30-in. staves and with 3 new manufacturers coming into production, there will be an ample supply of 150-lb. barrels. Also, assurance has been given that there will be no scarcity of steel for the four hoops specified for each barrel. On the basis of these conditions, recommendation was made for the adoption of the 150-lb. barrel as the standard container for bulk shipments.

That barrel is to be made of tongue-and-groove staves and heads. The staves are to be 30 in. long and the head 19½ in. in diameter. The staves to be made of strictly No. 1 hackberry, elm, gum or fir woods, which are so popular in the dried-milk industry, and the heads of cottonwood, gum, poplar or fir. The head should be secured by staples, put in by machine, instead of by nails.

As liners for these barrels, bag manufacturers recommend and sell kraft paper bags of two grades. They are used together to make a double bag assembly which is stronger and preferable to a single double-strength bag. The inner bag which comes in contact with the died egg is made from 35-lb. base paper and carries a 15 to 18 percent content of a 122 to 124 deg. F. melting point paraffin. The outer bag is made from 45-lb. base paper fully saturated with paraffin. Requirements for these bags should be anticipated as far in advance of delivery date as possible. Government demands are taking 20 percent of the kraft paper production and greatly interfere with paper bag manufacture.

British specifications calling for 12½-, 25-, and 50-lb. packages of dried eggs have been met by container manufacturers with moisture-vapor and temperature-change resisting paper containers as substitues for the 12½- and 25-lb. metal containers.

One type of these paper containers is the same as used by domestic companies for packaging puffed cereals, malt powder, dehydrated vegetables and other highly hygroscopic products. When dipped in a surface-sealing molten plastic they become highly resistant to moisture vapor transfer as well as to heat and light penetration. They may be used singly as a finished package or put into wooden cases to make up 100-lb. shipping units.

A second type of these paper containers consists of a heat-sealable laminated bag inside a solid fiber or corrugated-board box. This inner bag is of 5-ply construction made up of (1) a heavy paper outside wall, (2) an odorless and no-taste-imparting asphalt layer, (3) composition foil uniformly attached to the asphalt layer, (4) a thermoplastic adhesive layer, and (5) a "Pliofilm" or similar thermoplastic material as an inner layer.

Each of these paper containers, at present prices, costs from ½ to 4/5 cents per pound of content, depending upon size; shipping container or wooden case not included.

Mr. Termohlen announced that the Lease-Lend program for 1942 delivery would call for export shell eggs, frozen whole eggs, dried whites and frozen yolks, in addition to the 100,000,000 lb. of dried whole eggs which will be either bought or contracted by July 1, 1942. He closed the dried egg school with the warning that the quality of the dried egg product is to be the keystone of the industry's success and that the peace-time future of the dried-egg industry depends upon the job done for the Lease-Lend program for 1942.

Canned Whey Pudding

(*Continued from page 38*)

selection of a shortening and to compound the ingredients in such a manner that rancidity would not develop.

Whey Brown Bread

A canned whey brown bread was prepared according to the following modified formula:

	Percent by weight
Dry whey	8.7
Soft flour	5.2
Graham flour	7.0
Corn meal	21.0
Sodium bicarbonate	0.5
Molasses	21.0
Added water	36.6

Only a few batches of whey brown bread were made; consequently, this is not to be considered as a finished formula but is intended only as a basis for test runs. Bread crumbs could be substituted for the flour to prolong the shelf life and inhibit the development of a dry texture. The dry whey should be a water-soluble product suitable for use in foods. Plain condensed whey of 20 percent solids content could be used in place of the dry whey and water.

Summary

1. A formula for canned whey pudding (No. 5 or No. 6) was developed, which may be used to produce an attractive low-cost product suitable for commercial production.

2. Whey constituents produce a desirable flavor, color and nutritive value, contribute to the development of a cake-like texture, and furnish lactic acid which, with sodium bicarbonate, acts as a leavening agent. Up to 22 percent of the pudding solids, exclusive of fruit, was derived from whey.

3. The use of a valve-in-lid can allowed sealing the tins immediately after filling and automatically exhausting them during processing. The valves withstood the heating temperatures and held a vacuum up to 28 in. during storage.

References

1. G. A. Ramsdell and B. H. Webb. Sweetened Condensed Whey: Its Manufacture and Properties. *J. Dairy Science*, Vol. 21, 305 (June) 1938.
2. William F. Punte, Assignor to Continental Can Co., Inc. Valve Closed Metal Container. U. S. Patents 1,941,048; 1,950,-325-6-7.
3. L. A. Rogers. Ripening Cheese in A Sealed Package. *J. Dairy Science*, Vol. 15, 185 (May) 1932.

Facts About Lard

(*Continued from page 54*)

ing the fat by direct contact with steam in a closed vertical tank or cylinder under a pressure of from 30 to 50 lb. This method of rendering is adapted to converting large quantities of all kinds of fat into lard and accounts for approximately 85 percent of the lard produced under Federal inspection.

DRY-PROCESSED RENDERED lard is made by cooking fats in a horizontal steam jacketed tank under vacuum. This method of rendering also is adapted to the conversion of all fats into lard. The cylinder or tank in which the fat is cooked, however, is smaller than that used in the steam-rendering process.

NEUTRAL lard is rendered in a water-jacketed kettle and the fat is melted from the fiber or tissue by the slow heating of the water. Neutral lard is white in color and bland in flavor and is used largely for special purposes.

Dry process rendered lard and neutral lard are less used processes, but are slowly growing in popularity. A large percentage of commercial production is by packers who make at least some of each of these four kinds of lard. Although steam rendering is the process in most general use, kettle rendering is quite popular in establishments which produce relatively small quantities of lard.

Books

(*Continued from page 94*)

crease in carotenoid pigments. Valencia oranges (late) showed an increase in pigment in the juice up to February or March and this was usually followed by a decline. Seasonal changes in the mandarin type of oranges for the most part were similar to those in the sweet type, but the mandarin varieties were much higher in carotenoid pigments than other varieties. Ripening in all types was characterized by an increase in the soluble solids and in pH values, and a corresponding decrease in total acids and in ascorbic acid.

PATENTS

Bread Made and Baked in Continuous Manner—James T. Duffy, Jr., and Paul Jackson, York, Pa., to Read Machinery Co., Inc., York, Pa. No. 2,255,282. Sept. 9, 1941.

Cereals Impregnated With Edible Salts and Given Coating of Albumen and Edible Oil Preparatory to Being Puffed—Florence Welch, Omaha, Neb. No. 2,255,340. Sept. 9, 1941.

Lemon Juice Treated With Borax and Then With Boric Acid to Make Dry Stable Product Having Brilliant Lemon Yellow Color—Clarence Walter Wilson, Norco, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,255,341. Sept. 9, 1941.

Molasses- and Sugar-sweetened and Malt-Flavored Cereal Product Made Using Baked Cereal-flour Bread as Base—Stanley S. Langendorf, San Francisco, Calif. No. 2,255,427. Sept. 9, 1941.

Lard, Butter, Cheese and Like Packaged in Triangular Shaped Carton With Slight Saving in Paper Stock Used.—Leo Peters, to Armour and Co., Chicago, Ill. No. 2,255,492.

Ice Cream Container Made by Mixing Edible Cereal Powder with Moisture-repellant Edible Fat and Molding Into Desired Size and Shape Under Refrigeration—Nello Frediani, Lake Geneva, Wis. No. 2,255,506. Sept. 9, 1941.

Fruit Pitted in Machine Which Divides Meat and Pit Into Approximate Halves With Subsequent Removal of Half Pits—Albert Stanley Ridley, Kew, Victoria, Australia. No. 2,255,533. Sept. 9, 1941.

Frozen, Readily Melting Food Materials Dispensed From Storage Compartment by Automatic Mechanical Means — Nathan Schack and Hans Eberhart, St. Gall, Switzerland. No. 2,255,716. Sept. 9, 1941.

Honey Extracted From Comb by Centrifugal Force—Clarence Arthur Hungerford, Kurrajong Heights, near Sydney, Australia. No. 2,255,775. Sept. 16, 1941.

Meat Thinly Sliced, Assembled Into Cross-laid Groups and Shaped Under Pressure Into Compact Steaks—Lawrence L. Linane and George Federighi, San Francisco, Calif. No. 2,255,796. Sept. 16, 1941.

Sausages Contained in Processed Cellulose Casings Carrying Generic Trademark Insignia Which is Made Specific by Addition of Inscription on Encircling Strip Made of Same Material and Having the Same Properties as Casing—Harry H. Replogle, Scarsdale, N. Y., to Sylvania Industrial Corp., Fredericksburg, Va. No. 2,255,810. Sept. 16, 1941.

Oils Containing Fat-soluble Vitamins Treated With Activated Carbon Preparatory to Removal of Free Fatty Acids During Refining—Loran O. Buxton, Harrison, N. J., and Eric J. Simons, New York, N. Y., to National Oil Products Co., Harrison, N. J. No. 2,255,875. Sept. 16, 1941.

Chocolate Paste Tempered in Jacketed Kettle with Agitator; Side Walls Heated and Bottom Cooled Under Thermostatic Control—Edward D. Rapisardi, Agawam, Mass., to Baker Perkins Co., Inc., Saginaw, Mich. No. 2,255,986. Sept. 16, 1941.

Oil Extracted From Fish Tissue by Solvent Free From Volatile Constituents by High-vacuum Distillation, Leaving Constituents With Lower Vapor Pressure Than Vitamins Contained in Fish Tissue—Kenneth C. D. Hickman, to Distillation Products, Inc., Rochester, N. Y. No. 2,256,392. Sept. 16, 1941.

Correction

There was an error in the number of one of the patents listed in the September issue, page 105. That patent, with the correct number, follows:

Confections Packaged in Inflatable Rubber Balloon-type Container—Lloyd G. Copeman, to Copeman Laboratories Co., Flint, Mich. No. 2,248,963. July 15, 1941.

Doughnut Batter Discharged Through Nozzle Which Rotates in Circular Path to Deposit String of Batter on Surface of Cooking Fat—Abraham Kipnis, Rockaway, N. Y. No. 2,256,617. Sept. 23, 1941.

Vegetables and Like Precooled by Passing Through Enclosed Chamber Above Tank From Which Cooling Medium is Drawn and Discharged Into Trough Running Through Chamber Beneath Conveyor for Vegetables—Roy M. Magnuson to Food Machinery Corp., San Jose, Calif. No. 2,256,745. Sept. 23, 1941.

Heated Cheese Packed in Cellulose Wrapping Carrying Inner Coat of About 90 Percent Beeswax and 10 Percent Turpentine, Cheese Being Sufficiently Hot to Soften Coating and Make Adherent to Cheese When Cellulose is Folded Across Top of Open Package—H. M. Scott, Sweetwater, Tenn. No. 2,256,764. Sept. 23, 1941.

Bakery Dough Cut Into Strips, Then Into Segments Preparatory to Rolling Out Into Desired Shapes and Thicknesses Onto Peel Boards—Reinhart W. Pittman, Jackson Heights, N. Y. No. 2,256,927 Sept. 23, 1941.

Salad Fruits for Canning Mechanically Cut and Put Into Cans in Desired Proportions—Thomas Alton, to E. E. Chase, Jr., San Jose, Calif. No. 2,257,147. Sept. 30, 1941.

Papain Extracted From Latex of Green Fruit—Arnold K. Balls, Washington, D. C., Hans Lineweaver, Berkeley, Calif., and Sigmund Schwimmer, Washington, D. C., to Secretary of Agriculture of the United States of America. No. 2,257,218. Sept. 30, 1941.

Perishable Foodstuffs in Shipping Car or Truck Precooled by Portable Unit—Trice M. Bell, Tampa, Fla. No. 2,257,221. Sept. 30, 1941.

Artificial Sausage Skins Made by Using Albuminous Skin-forming Material to Form Inner Surface of Flexible and Gas-inflatable Tube—Armin Bergmann, Hamburg-Altona, Germany. No. 2,257, 222. Sept. 30, 1941.

Canadian Patents

Wheat Cleaned by Air Blast in Machine Having Screen With Longitudinal Wires Spaced to Pass Undersized Grains and Weed Seeds—Walter E. Dempsey, Moose Jaw, Saskatchewan. No. 398,940. Sept. 2, 1941.

Edible Oils and Fats Refined and Stabilized Against Rancidity by Removing Residual Catalyst and Other Impurities With HCl, Neutralizing With Sodium Hydroxide, Adding Antioxidant and Catalyst and Hydrogenating—A. E. Taylor and J. L. Jakobsen, to General Mills, Inc., Minneapolis, Minn. No. 399,020. Sept. 2, 1941.

Character of Roasted Coffee Determined by Exposing to Oxygen Under Controlled Conditions and Measuring Quantity of Oxygen Absorbed—Wm. R. Johnston, to Standard Brands, Inc., New York, N. Y. No. 399,060. Sept. 2, 1941.

Rice, Wheat and Other Cereals Improved in Color or Fortified in Food Factors by Pressure Steeping in Extract of Bran—Erich G. Huzenlaub, London, England. No. 399,099. Sept. 2, 1941.

Chocolate Caffeinized During Preparation of Cola-chocolate by Adding Powdered Roasted Coffee and Cola Nut Powder to Chocolate—Albert Rinne, Berlin-Westend, Germany. No. 399,102. Sept. 2, 1941.

Potato Chips Cooked in Machine Which Receives Raw Potato Slices at Heat-source End of Deep-fat Vat Heated Hot Enough to Encrust Slices Quickly and Make Them Buoyant; Fat Temperature Gradually Decreases During Passage to Delivery End—Sylvia O. Ferry, Administratrix of the Estate of Jos. D. Ferry, deceased, Harrisburg, Pa. No. 399,410. Sept. 16, 1941.

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FORMULAS FOR FOODS

FORMULA NO. 239

Fresh Apple Pie

Pie Crust

Cake flour	5 lb.
Milk powder	2½ oz.
Baking powder	1¼ oz.
All-purpose vegetable shortening	3 lb. 12 oz.
Cold water (variable)	2 lb.
Salt	2½ oz.

Sift flour, milk powder and baking powder together. Then mix 1 lb. 14 oz. of vegetable shortening into the dry ingredients until thoroughly mixed. Break the remaining vegetable shortening into small pieces in the above mix. Dissolve the salt in water. Add and mix lightly so as not to toughen the mix. Do not overmix crust after adding water.

Sugar-Spice Mix

Granulated sugar	6 lb.
Salt	1½ oz.
Cinnamon	¾ oz.
Mace	½ oz.

Sift the sugar-spice mix together three times.

Make-Up Directions

Line 9-in. pie plate with above pie crust. Place 1 lb. of fresh sliced apples in crust. Pour 6 oz. of the sugar-spice mix over the apples. Place ½ oz. of butter on top of the sugar-spice mix. Wash the edge of the crust with water. Cover with top crust and trim edges. Wash with milk.

Do not place sugar-spice mix under the apples. Let the pie stand for 30 minutes before baking. Bake at 440 deg. F. Transfer to paper plates while lukewarm.

Formula from Lever Bros. Co.

FORMULA NO. 240

Chicken Brawn

Fowl (after boning)	140 lb.
Pork (fresh)	30 lb.
Veal	30 lb.
Spiced jelly	24 gal.

Cook the fowl in lightly salted water until they bone clean. Remove from boiling pan to de-bone. Thoroughly drain the meat (otherwise jelly may subsequently become "sloppy"). Cook the pork and veal until just underdone and then drain well. Cut up meats and mix together. Spread on wire trays and place in room at 120 deg. F. (air temperature) for an hour, turning over the meat once during this period. Place the meat, together with the jelly (suitably spiced), into containers and sterilize at 240 deg. F. for a time depending on the size of the containers.

Spice jelly may be prepared from:

Gelatine	20 lb.
Egg albumin	1 lb.
Water	32 gal.
Salt	10 lb.
Whole cloves	¼ lb.
White pepper	½ lb.
Ground mace	3 oz.

The chicken bones and meat waste may be used in soups.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 241

Pumpernickel Bread

Rye meal	4 lb.
Rye flour	4 lb.
Strong clear flour	5-6 lb.
Water (variable)	1 gal.
Yeast	3 oz.
Salt	4 oz.
Malt extract	2 oz.

Directions

Temperature of stove should be approximately 82 deg. F. to obtain the best results. Approximate time for first rising, 1 hour, 30 minutes; second rising, 30 minutes; and take-in, 30 minutes.

Scale and round out the dough. Make up and place close together on boards or boxes dusted with cornmeal. Grease loaves when placing them together.

Formula from General Mills, Inc.

FORMULA NO. 242

Quince Marmalade

The fruit should be ripe, *i.e.*, pink inside. After peeling, the dummies are boiled in water until soft, and then passed through a pulping machine to remove the pips. About 1 gal. of pulp is obtained from 10 lb. of fruit. Sugar is added in the proportion of ¼ lb. to each pound of quince, and the mixture boiled to 223½ deg. F. If necessary, the color may be adjusted to a pale pink shade.

See also General Instructions, Formula No. 205.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 243

Banana Marmalade

Chop 10 lb. of sour apples and simmer gently for 30 minutes with 3 gal. of water. Then pass through a filter. Place 40 lb. of peeled and cut-up bananas with 2 gal. of water in a steam pan and simmer gently for 10 to 15 minutes. Pass through a sieve or pulping machine (8 mesh). Add 50 lb. of sugar to the apple juice in a steam pan and bring to boiling point. Cut off the steam and allow to stand for 5 minutes. Filter (or skim well) and add the banana pulp. Gently boil to 223 deg. F. Color to a yellow shade.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England.
Republication rights reserved.

FORMULA NO. 244

Lime and Lemon Marmalade

This is made in the same way as lime marmalade, using about 18 lb. of lemons to 10 lb. of limes.

See Formula No. 231 for instructions for making lime marmalade.

See also General Instructions, Formula No. 205.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 245

Peanut Wafer

Shortening	1 lb. 10 oz.
Sugar	4 lb. 4 oz.
Salt	2 oz.
Vanilla (optional)	1 oz.
Whole eggs	8 oz.
Soda (variable)	½ oz.
Ammonium carbonate (ammonia)	1 oz.
Skim milk powder	4 oz.
Pastry flour	6 lb. 4 oz.
Peanuts (roasted and ground)	5 lb.
Water (variable)	2 lb.

Mixing Directions

Cream the shortening lightly. Then add sugar, salt and vanilla and continue creaming until light. Add whole eggs gradually and mix in peanuts until thoroughly incorporated. Whip the skim milk powder in the water and then dissolve the soda and ammonium carbonate in the milk. Add this to the above mix and then incorporate the flour while mixing lightly. For variety place one-half peanut on top of each

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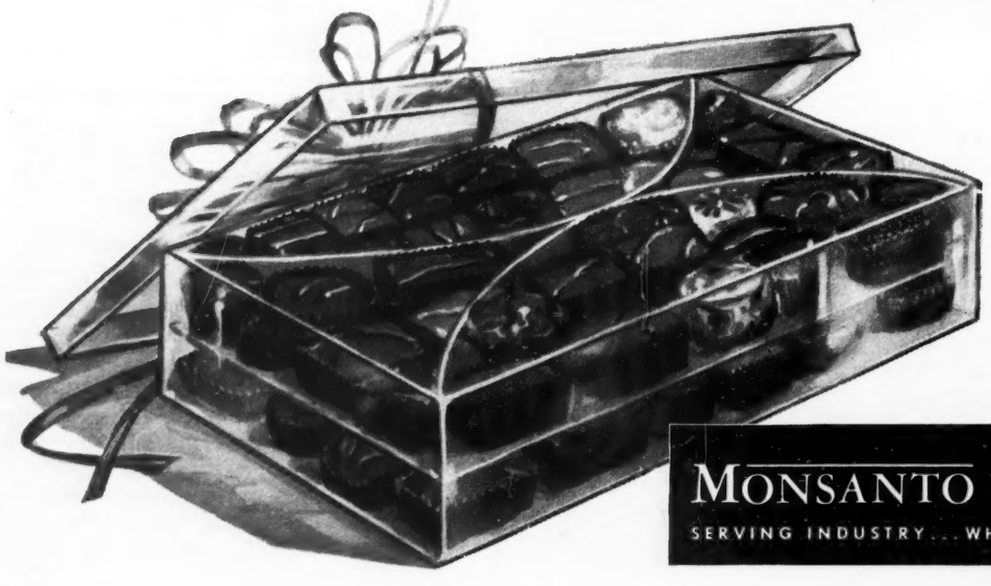

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cookie before baking. Oven temperature should be 380 to 400 deg. F. Formula will make approximately 10 dozen 2-in. cookies.

Formula from General Mills, Inc.

FORMULA NO. 246

Klondike Gold Cake

Cake flour	5 lb. 4 oz.
Granulated sugar	6 lb. 8 oz.
Butter	1 lb.
Shortening	1 lb.
Salt	2 oz.
Baking powder	4 oz.
Flavoring	2¼ oz.
Milk (liquid)	4 lb. 12 oz.
Whole eggs	1 lb.
Egg yolks	1 lb. 10 oz.

Mixing Directions

Place cake flour, sugar, butter, shortening, salt, baking powder, flavoring and 4 lb. of milk in machine bowl. Use paddle and mix until smooth, or about 3 minutes on low speed and 2 minutes on second speed. Mix eggs and 12 oz. of milk together. Stream these in slowly during first 2 minutes mixing on low speed. Continue mixing 1 minute more on low speed. Stir lumps out of bottom. Finish to smooth batter by mixing about 2 minutes more on second speed.

Baking Directions

For best results have butter and shortening 70 deg. F. Scale 12½ oz. Bake for about 22 to 25 minutes at 365 to 375 deg. F.

Formula from General Foods Sales Co., Inc.

FORMULA NO. 247

Curry Powder, Indian Type

Coriander	4 oz.
Tumeric	4 oz.
Cinnamon	2 lb.
Cayenne	8 oz.
Mustard	1 lb.
Ginger	1 lb.
Allspice	8 oz.
Fenugreek	2 lb.

All ingredients should be dry. Grind to fine powder and sift through a fine-mesh sieve. Mix thoroughly. Package in airtight, moisture-tight container to avoid loss of flavor.

FORMULA NO. 248

Marshmallow Cake Icing From Albumen

Albumen	1¼ lb.
Gelatine (220 bloom), high test	9 oz.
Granulated sugar	10½ oz.
Water (140 deg. F.)	11½ lb.
Vanilla	2½ oz.
Granulated sugar	21 lb.
Salt	5¼ oz.

Sift the albumen, gelatine and sugar three times. Place water in a mixing bowl and add the sifted albumen, gelatine and sugar and whip by hand until dissolved. Place bowl in machine and whip at high speed over a period of 6 minutes. Then whip at low speed for a few minutes. Add vanilla and mix 30 seconds. Add sugar and salt gradually over a period of 30 seconds. Remove whip and fold a few times by hand.

Formula presented by C. W. Lantz at annual meeting of American Society of Bakery Engineers, Chicago, March 14, 1940.

FORMULA NO. 249

Imitation Banana Sirup

Simple sirup (36 deg. Bé.)	10 gal.
Banana extract, imitation	80 fl. oz.
Yellow color solution	5 fl. oz.
Benzoate of soda solution	5 fl. oz.

Formula from David Algie.

FORMULA NO. 250

Imitation Banana Extract

Baker's analyzed amyl acetate	6 fl. oz.
Alcohol	½ gal.
Water	½ gal.
Yellow color solution	2 drams

Formula from David Algie.

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